The Builder.

VOL. XCI.—No. 3333. DECEMBER 22, 1906.

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Design for a Town Church (Awarded the Royal Academy Travelling Studentship) ..... By Mr. William Harvey.

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Recent Architectural Developments in Jerusalem.—I.

THE visitor to Jerusalem in this XXth century still experiences the sensations of the ancient pilgrims on approaching Jaffa. He still runs the risk of drowning, and being sent to a celestial Jerusalem without seeing the terrestrial prototype. All idea of making a port of Jaffa seems now to be finally abandoned, and the project for uniting the short Jerusalem-Jaffa railway with the new Haifa-Damascus line (recently opened) will come about in due course, and future pilgrims and tourists will be landed either at Beyrout or Haifa and approach the Holy City in a somewhat more civilised manner than at present. In course of time Haifa may be provided with a port, but in any case, as soon as the short line to join on to the Jaffa railway is completed, Jaffa itself will cease to be of any importance for passenger steamers.

Jaffa has been but little altered of recent years—since the days of the early German Colony. It remains as filthy as ever, and the only additions of importance are on the outskirts near the railway station. The famous German Colony founded by Hofmann, the Christian Socialist, has not increased, but it has been decorated with a small Lutheran church—presented by the German Government. This new church has a poor little tower and spire 90 ft. high, which serves as a landmark of the colony and the German hotels. The building is entirely without any architectural character.

The Turks have also added on the north side of the town a few buildings in the usual coarse style imitative of European work—a botch of misunderstood and misapplied architectural detail. These consist of a new Serai and police offices and a singular-looking clock tower, about 60 ft. high, crowned with a large bell, on which the hours are struck according to the Arabic calculation of time. This clock and bell suggest the fact that the times are changing; a generation back the Eastern mind could not tolerate the sound of a bell, and the call of the Muezzin was a sufficient indication of the passage of time. The idea that "time is money" has, however, penetrated Turkey at last.

As the traveller leaves Jaffa (in a train said to have been constructed for the Panama Isthmus—the engines and carriages are at least marked "America") he is carried for several miles through most flourishing orange groves and olive plantations. These seem to have been much extended during the past few years. Amongst this verdure the tower of a new Russian church is discernible to the east of Jaffa. It seems a commonplace whitewashed building, designed on the principle by which a child builds a tower of toy bricks. At the station of Ramleh, the future junction for Haifa, anyone who knew Palestine ten years ago will rub his eyes with astonishment at another staring whitewashed church (Latin), with a high tower and spire, appearing amongst the palm trees, the prickly pear hedges, and the minarets of the old Arab town. The minarets and the famous old square tower of Ramleh seem quite dwarfed and insignificant by the side of this glaring white rival, which has appeared on the scene during the past two or three years. This tower from its elevated position looks very imposing, although it is not perhaps more than 100 ft. high.

The new suburbs around Jerusalem—especially on the southern side near the railway — are spreading with the rapidity of an important European town. The Plain of Rephaim, a tract of barren stony ground which stretches from Jerusalem half-way to Bethlehem, is getting covered with houses and gardens. The supply of water, which formerly was supposed to be non-existent, seems now to be sufficient for the purpose. Here the houses are being built in some cases by German workmen, although the majority of the occupants are the indefinable "Levantines." The German Colony, which until a few years ago was a settlement in the wilderness outside the walls of Jerusalem, is now fading into a mere portion of this vast suburb. Soon the houses—and amongst them several manufactory chimneys are visible—will have reached the ridge which separates Jerusalem and the Plain of Rephaim from Rachel's Tomb and Bethlehem.

The southern suburb of Jerusalem does not afford very much of interest to an architectural student, although the

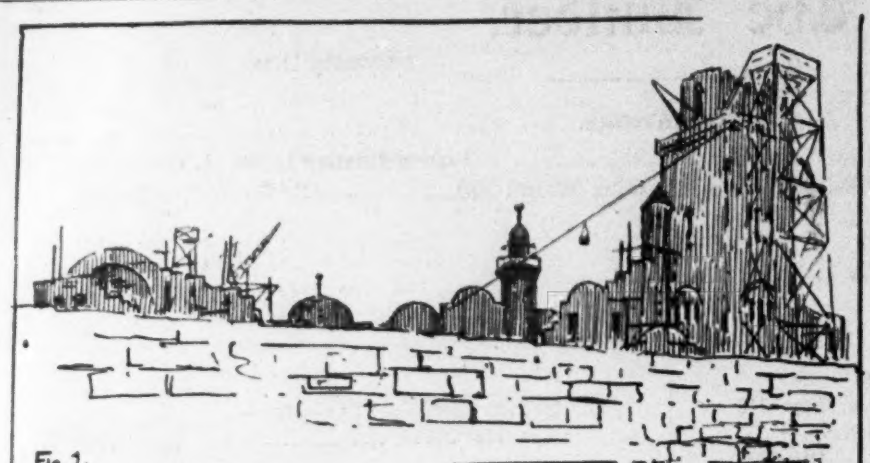

Fig. 1.
Rough sketch of the works in progress seen from over the wall of the Greek Cemetery. The Cenaculum beyond

Fig. 2
Sketch of Cenaculum showing wall shafts at X X. of old church

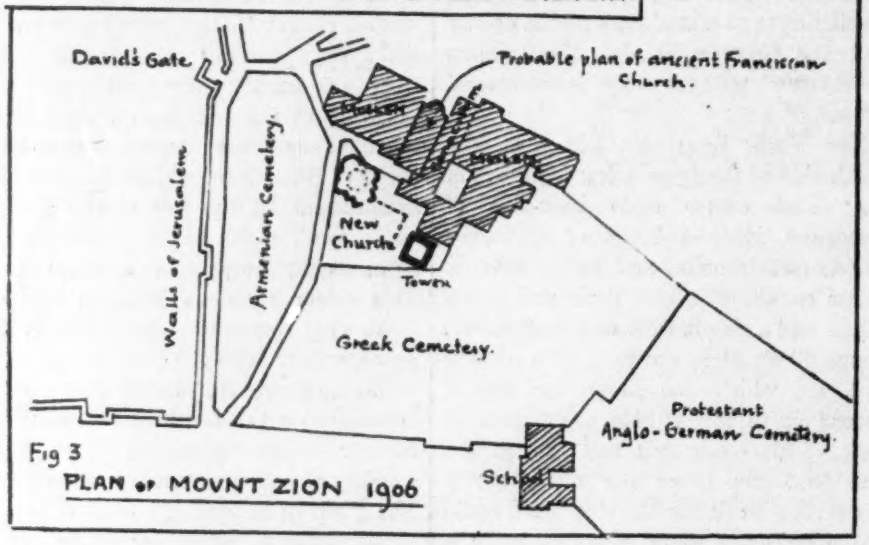

Fig 3
PLAN of MOUNT ZION 1906

method of building is of a substantial kind, and the amount of carved and moulded stonework ought to be of sufficient importance to give a certain style and character to the buildings. But unfortunately the only perceptible characteristic of these new buildings is the way in which they have all been copied, after a fashion, from European designs of the poorest quality. There is a singularly depressing effect produced by the clumsy attempts at carving the well-worn *motifs* of the classical or "Italian" Renaissance; when the effort has evidently been to impart the "Gothic style" to a building the depth of modern dulness seems to have been reached.

Turning from this modern suburb the visitor, as he approaches the old Jaffa gate of the city, is astonished by the prodigious monument now rising slowly on Mount Zion—the immense church of the Cenaculum, or of the House of the Virgin Mary. The ground on which the new church stands was formerly the cemetery of the American Presbyterians. This society sold the site to the committee of the new German church about the year 1899, and since that time the new buildings have been in progress. Part of the site seems to have been occupied by a plague-pit of ancient times, and of course there were the usual traces of ancient foundations always met with near Jerusalem. Surrounding the site are the immense cemeteries of different Christian sects inhabiting the Holy City, Armenian, Orthodox, Roman Catholic, and not least important that of the English Protestants.

As will be noticed in the sketch (Fig. 1) the new church almost completely hides from view the old mosque of Neby Daoud which contains the "Upper Chamber" of the Cenaculum. The new building is evidently intended to be the latest in a long succession of monuments which have crowned the summit of Mount Zion as memorials of the house where the institution of the Sacrament of the Lord's Supper took place. Perhaps one of the most interesting features about this new church is that it should be built under the patronage of the present German Emperor, whilst the fragment of its immediate predecessor still surviving within the walls of the mosque adjoining may very possibly include the work of Cypriote masons employed by the Emperor Frederic II. in about 1230. In this connexion it may be interesting to give some account of the ancient building of the Cenaculum, which is illustrated in Figs. 2 and 3.

Fifty years ago De Vogüe gave the first architectural description of the Cenaculum in his "Eglises de la Terre Sainte." He states, "All the churches successively built on this site have preserved the traditional idea of a two-storied building to serve as a commemoration of the upper chamber of the Cenaculum. The present remains date from 1342, when the Franciscans were permitted to first occupy the site. They consist of an upper and a lower church, each measuring 14 mètres by 9 mètres. Each story is divided by an arcade of three arches, carried on two columns, with semi-columns on the side and end walls. The capitals of these columns in the upper chamber are carved with elaborate XIVth century foliage, and they receive the arches and ribs of the six cross vaults. Three windows exist on the south side of each story. A staircase in the south-west corner affords communication between the stories. It is apparently the only example of the "Gothic style" in Jerusalem, and was perhaps built by Cypriote masons. The building has suffered much from ill-usage and the additions made by the Moslems during the last few centuries. At the east end of the monument on each floor is a small chamber called the Tomb of David.

The traditional founder of the Franciscan Convent of Mount Zion was no less a person than S. Francis himself, whilst on his pilgrimage in Egypt and Palestine at the beginning of the XIIIth century. Another legend attributes the building of a Gothic church on the site to King Robert of Naples and Sicily, in the year 1313.

As will be noticed in the sketch (Fig. 4)* of the remaining fragment of a mediæval church called the "Upper Chamber," the style of art is much more suggestive of the XIIth century than of the XIVth. De Vogüe's description of it as of the latter period is evidently erroneous. A greater probability seems to be that these remains may have belonged to the period of Frederick the Second (1225), in fact they possibly survive from the first Franciscan church built on the site, under the initiative of the great founder of the Order and the protection of the famous Emperor.

It must be remembered that the Gothic style reached its full and even last development in the south of Italy and Sicily early in the XIVth century, when, for instance, King Robert and

* This sketch is part of another block, and will appear in the next issue.

Queen Sancia were building the vast church of Santa Chiara, Naples, in the southern "flamboyant" manner, with even the early Renaissance element in its tower. The existing remains of the Cenaculum look very much older than such a period.

Externally there is very little to be seen of anything mediæval about the buildings. It can only be suggested that the northern external wall of the "Upper Chamber" is probably the southern wall of a church which occupied the site, as shown on Fig. 3. This church would probably be a nave and chancel, with the two-storied aisle of the "Upper Chamber" on its south side. There appear to be two of the nave wall-shafts still surviving from this ancient nave, visible in the sketch, Fig. 2. They have lost their capitals. These traces of the Middle Ages are now so buried amongst the accretions of Moslem times that it is almost impossible to see anything either inside or outside the collection of little rooms, thickly plastered internally, which now fills up the space where once the church stood. Possibly ere long the Moslems, to whom the property belongs, may take it into their heads to restore the "Tomb of David," and during such a process a totally different and unexpected historical evidence may come to light.

The new German church of the "Virgins House" (another name for the "Cenaculum") is a domical structure of cruciform plan, the general idea of which can be gathered from the sketch-map of the site, in Fig. 3. The architect of the new church is Herr Dombaumeister Renaud, of Cologne. The buildings are still too unfinished to admit of criticism.*

IRISH GRANITE AND MARBLE.

AS everybody knows, very little has been done in the past to develop the great mineral wealth of Ireland. So far as iron, lead, silver, and copper are concerned, there may be good reasons for lack of enterprise, but there are none that should be allowed to interfere with the production and supply of the excellent building stones that are to be found in various parts of the island.

One of the most promising centres for the encouragement of export trade in Irish building stones is the town of Galway, near which granite and marble quarries and works have been in existence for a number of years.

We have recently received several samples of granite and marble from an association that has been formed with the object of promoting the use of Irish stone by purchasing certain quarries, and the granite and marble works at Galway, so that by the introduction of modern machinery and appliances it may be possible to undertake the execution of large orders, such as have been repeatedly refused in the past owing to inadequacy of equipment and organisation.

The samples to which we refer comprise three varieties of granite—red, grey and red, and blue and red respectively—and three examples of marble—light and dark green, and black.

The red granite—from the Shantallow quarry, Galway—is a stone of exceptionally fine quality, very much resembling Aberdeen granite. This stone takes a remarkably high polish, is free from iron nodules and other defects, and exhibits closely aggregated crystals of quartz intimately mixed with coloured felspars, giving a mottled surface of uniform appearance and texture. The grey and red granite—from Bushy Park quarry—has also a mottled surface, but red occurs in patches of fairly large size, while the texture and general quality of the stone are distinctly inferior to that from the Shantallow quarry. The blue and red granite—from Barna quarry—is mottled with red in fairly small patches, and is almost equal in quality to the Shantallow stone.

The two green marbles are samples of the rock termed "ophicalcite"—a combination of green serpentine with crystalline limestone—commonly known to architects as "Irish green" or "Connemara marble." The darker of the two samples is a beautifully-veined stone capable of taking a high polish, and particularly adapted to decorative work. The black marble—from a quarry in the neighbourhood of Galway town—is a stone of fine texture and uniform colour, also taking a good polish.

From a report made by Mr. A. McHenry, of H. M. Geological Survey of Ireland, it appears that the Shantallow granite exists in practically inexhaustible quantities, and that, although only small openings have been made in the locality, stones of excellent quality, of large size and free from joints, have been obtained and manufactured into polished columns for churches and other architectural works. Mr. McHenry adds the opinion that if quarries were opened up on a suitable scale it would be possible to obtain solid masses exceeding 100 cubic feet in bulk.

A similarly favourable report has been made upon the same property by Mr. Thomes Jones, M.Inst.C.E., of Westminster, who states that surface openings show the rock to be exceptionally solid, free from joints, and capable of yielding blocks of the largest size and of the best possible quality and grain for architectural and engineering purposes.

We understand that the Shantallow granite quarry is within easy distance of the Galway docks and railway station, thus affording convenient facilities for transport both by sea and by rail, and that the Galway Harbour Board have expressed their readiness to give shed accommodation and wayleave for a railway connecting the quarry and works with the docks. The works appear to be of small size and altogether of most primitive character, but as they occupy a site on the River Corrib, whence an unlimited supply of water power could be derived, it would be easy to lay down modern plant on an extensive scale for dealing with all kinds of stone in an adequate manner.

With granite and black marble quarries close to the works, and green marble quarries within a few miles, there is no reason why a properly equipped establishment should not be financially successful. One thing, however, is lacking—that is the capital necessary to give the enterprise a fair start. So we come to the great need that stands to-day, as it has stood for years past, in the way of industrial progress throughout Ireland, with the solitary exception of Belfast and the surrounding district.

Great as the mineral resources of Ireland may be, Irish capitalistis do not seem eager to develop them, and are still less eager to invest money in so doing. While this attitude prevails it cannot be expected that the support of English investors will be secured. We should be glad to witness the advent of a better state of things, for it is clearly undesirable that foreign countries should be supplying products that might just as easily be supplied from within our own shores, and be drawing money that would do incalculable good to the Sister Isle if it could be caused to flow in that direction.

* To be concluded in our next issue.

NOTES.

The Trades Disputes Bill.

THE Trades Disputes Bill passed through the House of Lords with very slight amendment. Clause 4, which is the clause which gives Trade Unions immunity from civil process, was allowed to go unamended, although resolutions were moved limiting the clause to matters arising out of trades disputes—a limitation which would have been most desirable. Words were introduced into the picketing clause which would have caused the attendance to peacefully persuade to be peaceably and reasonably conducted, as well as the act of persuasion itself. These words were in the Bill when it was introduced, and it is most significant of the attitude of the present Parliament that when the Bill came back to the House of Commons the House declined to approve even this restatement of a principle originally advocated by the Government itself. The House of Commons will require a reminder that this country is not governed by a single chamber which represents but a small majority in the country. It is true that as long as clause 4 remains unamended, detail in other clauses is of limited importance, since if the Unions—the solvent and governing bodies—are placed outside the law, remedies against irresponsible men of straw are illusory in the case of civil procedure; but this Bill, by rendering legal certain acts, will also affect the criminal procedure against the actual perpetrators of acts detrimental to others.

Labour Returns.

THE Labour Returns for November are disappointing in that although the general improvement in trade continues, the building trade still does not share the improved conditions which are affecting other industries. The general wages bill improved in November to the extent of 3,600*l.*, and 160,000 workpeople participated in this, which averaged gives about 5d. a week per head. The proportion of unemployed is only slightly less than in the same month last year, but trade disputes have much to do with this, for 32,828 more workpeople were affected this November by trade disputes than in last November, and 348,000 more working days have been lost.

Railway Rates Again.

THOSE who followed closely the events leading up to the passing of the Railway Rates Acts of 1891 will have read the remarks made last week by the President of the Board of Trade with apprehension. The interminable proceedings—Commissions and inquiries, conferences and deputations, resulted, it was fondly hoped, in a more or less satisfactory settlement of a vexed question. It is very disquieting, therefore, to learn that "we shall possibly have to consider the whole question of railway rates again from beginning to end." The particular subject which called forth this remark was one not at present dealt with by legislation—viz., the question of "Owner's Risk." At a very early stage in the railway rates controversy this matter was dealt with at some length in our columns;* and, as the companies were left with a free hand in this respect, the conditions are much the same now as they were at that time. Such alterations as have been made are all for the worse. Concessions wrung from them in other directions caused the companies to combine their forces for the purpose of exacting their pound of flesh, as far as possible, where they were unfettered. Thus we find that the list of articles which they will carry at "Companies' Risk" only when packed to their satisfaction—which was quite small in 1884—had risen to 82 in 1895, and now numbers 180. The President of the Board of Trade intimated that a short Bill might be introduced next session to deal with the points in question. Should this suffice without reopening "the whole question from beginning to end," it would assuredly dispel a veritable nightmare from both railway and Board of Trade officials, and, probably, be quite a relief to the majority of the manufacturing and trading community as well.

Lighting of Railway Premises.

A PAPER on this subject, read before the Institution of Mechanical Engineers on Friday last week by Mr. Henry Fowler, is of general interest to all who have to deal with the lighting of fairly large interiors and of outdoor spaces. The lighting installations of a railway system are necessarily of most varied character, not merely because different kinds of buildings require different treatment, but also for the reason that illuminants which are readily obtained or produced in large towns are not available or cannot be produced economically in outlying country stations. As the same considerations apply to hospitals and other buildings, for the design and illumination of which architects are responsible, the contents of Mr. Fowler's paper should be of interest to our readers. The author deals fully and in a generally satisfactory manner with lighting by means of oil, petrol vapour, acetylene, gas, and electricity, and gives numerous illumination curves showing the efficiency of the several systems of lighting used on the Midland Railway. Nothing is said relative to the lighting of railway carriages, a subject which is of paramount importance, because it affects the safety of the public far more than the lighting of railway buildings. The omission is possibly due to the fact that the Midland carriage department is quite distinct from the locomotive department, to which the author is attached. We hope, however, that the question of carriage lighting will be brought forward in the adjourned discussion of the paper, and that members of the Institution will unite in expressing disapproval of the perpetuation of oil and gas in any form as materials of illumination for railway carriages.

* See the *Builder* for October 18, 1884, p. 515.

The Efficiency of Refuse Destructors.

AS MANY of our readers are doubtless aware, competition among makers of destructor furnaces is particularly acute. Each patentee, as a general rule, misses no opportunity of trying to prove the marvellous superiority of his own apparatus over that of his rivals, and various statements that are not the whole truth and nothing but the truth are put forward from time to time with the obvious intention of misleading prospective buyers. One very popular device of the kind is to compare different types of furnace in terms of "water evaporated per pound of refuse burned," without differentiating between the calorific value of the refuse and the efficiency of the boiler plant, and without stating how much of the steam raised is used unproductively for boiler feed and forced draught appliances. Another is, to compare different types of furnace in terms of "electrical units generated per ton of refuse burned," without stating the efficiency of the generating machinery. The calorific value of refuse varies greatly; the efficiency of the steam-raising plant depends largely upon the presence or absence of economisers and other auxiliaries for the utilisation of heat, and in some plants nearly 18 per cent. of the total steam raised is consumed in the production of forced draught. These are points upon which the wily circular writer preserves discreet silence, but they should receive close attention from intending purchasers. Again, the number of units generated per ton of refuse depends absolutely upon the efficiency of the generating plant, and especially upon the weight of steam required by the steam engine per brake horse-power. As the efficiency of steam engines varies by as much as 300 per cent., it is clear that comparisons on the basis of "units per ton of refuse" may be misleading in the extreme.

New Traffic Facilities.

THREE new routes across London were opened to the public on Saturday last. The most important of these is the railway between Hammersmith and Finsbury Park, destined within a short time to constitute a connecting-link between an extensive system comprising the Metropolitan and District, the City and South London, the Waterloo and City, the Waterloo and Baker-street, and the Charing Cross, Euston, and Hampstead Railways. The ramifications of these several lines extend over the chief districts of Central London and stretch out into outlying suburbs on the north, south, east, and west. The opening of the London County Council tramway route along the Embankment is the first instalment of a useful scheme for enlarging the scope of the southern tramway system, and for placing north and south London in direct communication. The establishment of an electric tramway service between Poplar and Aldgate also deserves notice, especially in view of its approaching extension to Bloomsbury. In addition to these new electric routes, the inauguration of the through-booking system on the London United Electric Tramways, the District Railway, and the new Piccadilly Tube marks a distinct advance towards the co-ordination of traffic facilities in the metropolis.

The Thames Steamboats.

THE inhabitants of London have two reasons for regretting the unfavourable result that has attended the efforts of the London County Council to popularise the River Thames as a main highway for business and pleasure. In riverside districts generally there is a strong feeling in favour of the services being continued throughout the year, and the opinion is also entertained that the usefulness of the services could be enlarged if developed in such a manner as to provide ferry facilities. A very sensible proposal made by the Rivers Committee on Tuesday last was to the effect that the control of the steamboat services, together with the Woolwich Ferry, should be transferred to the Highways Committee, so that they might be worked in conjunction with the tramway traffic of the Council. There is clearly a good deal to be said on behalf of such an arrangement, which would place the Highways Committee somewhat in the same position as that occupied by various railway companies who find decided advantage from the establishment of steamship services in connexion with their land traffic.

The Heating of Dynamos.

THE paper read last week by Mr. G. A. Lister to the Birmingham Local Section of the Institution of Electrical Engineers on the heating of dynamo coils is deserving of study by electrical engineers. Most manufacturers take special pains to ventilate the windings of the dynamo by utilising the fan action of the rotating parts. But, as a rule, little attention is paid to the problem of the cooling of the field coils, or, as they are now generally called, the magnet coils of the machine. Mr. Lister points out the importance of properly designing the cooling surface of the coils, so as to enable them to get rid of the heat unavoidably generated as readily as possible. The price of a dynamo depends on the maximum permissible output of the machine, and this output is governed mainly by the maximum permissible rise of temperature in the armature. It has been found that overheating has a very deleterious action on many insulating materials, and so it is highly probable that the permissible heating will be considerably lowered in the immediate future in this country, as it already has been in America. This will make the study of the methods of cooling even of greater importance to the electrical engineer, and a study of the laws of thermal radiation and conduction will be absolutely essential. Mr. Lister's experimental results show the considerable

effect produced by the covering wrapped round the coil on its temperature rise when a given current is passing through it. These coverings, therefore, ought to be as thin as possible, and in addition the varnish used ought to be a good conductor of heat. In America the tapes generally used for covering magnet coils are now being replaced by rope, the heat escaping readily between the interstices of the rope, and a new class of "heat dissipating" varnishes are being placed on the market. Electro-enamel, which was originally produced by a Continental firm as a material suitable for coating accumulator-boxes as acids had no effect on it, has been found useful for dissipating heat. Coils coated with it keep decidedly cooler, and so the insulating materials employed do not deteriorate so rapidly.

The Colour of Motor-cars.

MOTOR-CAR owners should have their attention drawn to a case recently brought before the Highgate Bench. The owner of a car was summoned for not having notified the London County Council of a circumstance affecting the particulars entered in the registration of the car, viz., a change effected in its colour. The owner pleaded ignorance of the fact that a change in the colour the car was painted was a matter requiring notification, and probably his ignorance on this point may be shared by many others. The Statutory Rules and Orders made under the Motor Car Act, 1903, provide in Art. II. that the owner of a motor-car desiring to register the same shall furnish the County Councils with the particulars set out in the terms in the third schedule to the Order. This schedule contains a space in which "the type and colour of body of car" must be set out. Then Art. V. provides that "If any circumstance . . : occurs in relation to any motor-car which affects the accuracy of any particulars entered as respects that car in the Register of Motor-cars, the owner of the motor-car shall forthwith inform the Council with whom it has been registered . . :" No fee is chargeable for making the amendment in the Register."

The Goupil Gallery Salon.

THE proprietors of the Goupil Gallery have now enlarged their exhibition space by a whole range of rooms upstairs, which they have opened with a special exhibition of some interest. It is almost needless to say that the bulk of the works exhibited are in that broad and almost splashy ultra-modern style which generally prevails at this gallery. But if there is no finish (which is now considered a weakness in painting), there is much fine composition and suggestive work to be seen. The contempt for accuracy of detail is unfortunately illustrated in Mr. Fowler's otherwise fine snow landscape, "The Morning Express" (11), which faces one on entering the room, in which the train coming round the curve is running in the "six-foot" instead of on the proper track; it does not affect the picture as a landscape, but it is an irritating piece of carelessness which might easily have been avoided. There is poetry of feeling and composition in Mr. Chappell's and Mr. Duff's two landscapes, both called "The Flock" (16, 18); Mr. Matthews's "Burgos Cathedral" (31), with the sunset sky behind the towers, is a fine effect; Mr. Oliver Hall's "The Glamour of the Forest" (32) is too glamourish, and Mr. Moffat Lindner's "The White Cloud" (35) is *toujours perdrix*. In the second gallery we may notice especially Mr. Aumonier's "Sunlight on the Downs" (45), Mr. Weiss's white houses and a bridge in "Sunny October" (47), Mr. Montague Smyth's "November Evening" (57), which reminds one of Corot, and Mr. Laidlay's reposeful coast scene, entitled "Twilight" (59). In the third gallery a large, bold, coarse portrait by M. J. Blanche (71) occupies the central place, and does not attract us. There are good examples of the work of M. Israels, M. Le Sidaner, Mr. Weiss, and other well-known painters. In the fourth gallery, on another floor, there is an interesting collection of mostly slight water-colour studies, among which the small landscape sketches by Mr. A. E. Vokes, a new artist, are of considerable promise.

The Fine Art Society.

AT the Fine Art Society's Gallery a collection of water-colours of French Towns and Dutch Dykes, by Mr. A. Romilly Fedden, contains some admirable pictures both of town scenes and landscape. The author does not seem to have quite settled on a style; the two first things in the catalogue seem to be in two different styles, but this impression may result partly from the great difference of the two subjects. "The Washing Place" (24), the largest of the drawings, shows a much bolder manner of handling than any of the smaller ones. Of the latter, "A Village on the Zuyder Zee" (15), "A French 'Place' in Sunlight" (17), "The Lonely Farm" (78), and "Top o' the Hill" (19) are among the best. In another room is a small collection of oil paintings and water-colours of Holland by Herr Gruppé, a good painter of the modern Dutch school; restful pictures of flat landscapes and large grey skies, somewhat after the manner of Maris. There is also a special collection, in glass cases, of table glass and ornaments, intended apparently to tempt the purchasers of Christmas presents, who may find some good things there.

An American Gold Medal.

THE fiftieth anniversary of the American Institute of Architects is to be held at Washington on January 7, 8, and 9. In celebration of the occasion, the American Institute has decided on the presentation of an annual Gold Medal, on similar lines to that of the Royal Institute of British Architects, and they are offering the first presentation of it to an English architect, Sir Aston Webb. Nothing could have been more graceful on their part than this resolution to offer their first Gold Medal to an architect from the old country, and no choice could have been better and more suitable than the one they have made. Sir Aston and Lady Webb leave England, we believe, to-day (the 22nd) to be present at the meeting at Washington, and all their friends will wish them a fair passage and a safe journey; no other wish is necessary, for once arrived at Washington we have no doubt that they will receive an American welcome and American hospitality, which means all that could be said or wished for in that connexion.

THE PICCADILLY TUBE.

By the opening on Saturday last of the Great Northern, Piccadilly, and Brompton Railway another important link has been added between the north-east and west of London, or, put in another way, between the west central district and the north-east and west respectively. This line represents the realisation of two distinct schemes—the Brompton and Piccadilly-circus Railway, authorised in 1897, and the Great Northern and Strand Railway, authorised two years later. The two projects were taken over in 1901 by the Yerkes Syndicate, now the Underground Electric Railways Company, by whom powers were obtained to connect the Brompton and Piccadilly Railway with the Great Northern and Strand Railway by a line between Piccadilly-circus and Holborn Stations. Thus the original central London terminus of the Great Northern and Strand Railway was left out in the cold, and when opened in May, 1907, will be at the end of a short branch joining the main line at Holborn. As at first projected, the Great Northern and Strand Railway was intended to start at Wood Green, but the proposed construction north of Finsbury Park has been abandoned. Consequently the new tube commences beneath the Finsbury Park Station of the Great Northern Railway, and proceeds through Holloway, St. Pancras, Holborn, and thence westward to Kensington and Hammersmith.

With a total double-track mileage, including the Strand branch, of 9·32 miles, the new tube is the longest railway of its kind hitherto constructed, and, in addition to serving twenty-two stations, it affords most useful opportunities for the interchange of traffic with other railways.

At Finsbury Park passengers have means of access to the main line and suburban trains of the Great Northern Railway, and at King's Cross there is a station which, in addition to facilitating the exchange of traffic with the Great Northern, will be of almost equal convenience as a connexion with the Midland, Metropolitan, and South-Eastern and Chatham systems. Moreover, a subway now under construction will afford communication with the King's Cross Station of the Euston branch of the City and South London Railway, which will shortly be completed.

At Holborn there is a junction with the Strand branch, but, unfortunately, no attempt has been made to establish a direct connexion with the Central London Railway. Passengers desiring to change for that line will have to perform a double lift journey and walk across two main streets to the British Museum Station. Whether this inconvenient arrangement is due to the fact that the Central London Railway is a rival rather than a feeding line we do not know, but it is certainly a serious defect of a kind that will not be permitted when London is provided with a central traffic authority. Leicester-square Station will be an important point on the completion of the Charing Cross, Euston, and Hampstead line of the same company, and here we are glad to find provision is being made for the interchange of traffic by means of subways.

Piccadilly-circus is another point where two lines of the company meet, and consequently where adequate connexion is made enabling passengers on the Piccadilly and the Waterloo and Baker-street Railways to pass from one system to the other without inconvenience.

At South Kensington the station of the new tube is alongside that of the District Railway—also controlled by the Underground Electric Railways Company—thus enabling the entire traffic of the Inner Circle service to be tapped. Similar facilities are provided at Gloucester-road, Earl's Court, Baron's Court, and Hammersmith. The terminus at Hammersmith is in close touch with the system of the London United Tramways Company, with whom an arrangement for through bookings has been made. The

studious care displayed by the company to provide for the interchange of traffic with their own and feeder lines is in sharp contrast with the apparent indifference exhibited for the convenience of the travelling public at Holborn.

From Hammersmith to a point between West Kensington and Baron's Court the new line runs on the surface alongside the District Railway. Then, dipping down, it passes beneath the District Railway as far as South Kensington, and beyond that station enters the London clay as a low-level tube, the depth varying between 29 ft. and 123 ft.

The tunnels are of circular cross-section, the diameter being 11 ft. 8 in. on the straight, 12 ft. on curves of more than ten chains radius, and 12 ft. 6 in. on curves of less than the same radius. The station tunnels are of about 22 ft. internal diameter, and enlarged tunnels are provided for cross-overs at Hyde Park-corner, Covent-garden, York-road, and Finsbury Park.

With the object of reducing vibration to a minimum, the concrete bed at the bottom of the tunnel does not extend to the full width of the permanent way. Therefore the ends of the sleepers overhang, and are supported by a loosely-compacted bed of crushed granite, which permits the elasticity of the timber to be developed to a certain extent.

A new feature of the tunnels is that the concrete lining is carried to the height of 2 ft. above the ballast of the permanent way, for the purpose of affording a safeguard against accidental contact between the live rail and the flanges of the cast-iron lining.

As on the Baker-street and Waterloo line, all the stations are tiled in distinctive patterns in accordance with designs prepared by Mr. Leslie W. Green, the architect to the company. The general arrangement of the stations also resembles that on the Baker-street and Waterloo Railway, except that the platforms measure 350 ft. long instead of 291 ft. At the Strand Station, however, the platforms measure only 250 ft. long. The system of ventilation is practically identical with that of the Baker-street and Waterloo Railway, which was described in our article of March 17, 1906. On the new tube nineteen exhaust fans are installed at different points, each extracting 18,500 cubic ft. of air per minute from the tunnel and stations and discharging through outlets on the station roofs.

The architectural features of the Hammersmith terminus are somewhat unusual in British railway practice. The roof is of light steel and glass construction, and the three platforms are of concrete. The lay-out of the station seems to be well adapted for dealing with traffic, as there are only two lines of rail to the three platforms, thereby permitting outgoing passengers to step out on one side of the train while incoming passengers get in at the other side. This system of separating the two streams of passengers has proved very successful in connexion with the lift services on the Baker-street and Waterloo Railway, and deserves to be copied by other lines.

Power for operating the line is supplied from the generating station of the Underground Electric Railways Company at Lots-road, Chelsea, whence also current is drawn for the District and the Baker-street and Waterloo Railways. Three-phase alternating current is there generated at 11,000 volts, and conveyed to sub-stations at Hyde Park-corner, Russell-square, and Holloway, where it is transformed to 550-volt continuous current for use by the train motors and in the lift and lighting installations.

All the stations are lighted by Maxim arc lamps and incandescent lamps, the latter being used throughout the tunnels, where they are spaced at intervals of 42 ft. apart. The incandescent lighting circuits are independent of the traction circuits, and, as an additional precaution against accidental darkness, the company have installed an independent system of station lighting, to which current is supplied by the local supply companies.

Signalling is conducted throughout the line on the Westinghouse electro-pneumatic system, and one quite novel feature is the introduction of an automatic fog-signalling machine for the section of the line between Baron's Court and Hammersmith.

All the passenger cars are built of steel, with an internal lining of non-flammable mahogany mounted on asbestos millboard, and all the lifts but those at Finsbury Park are built with steel cages having Karri non-flammable floors. No lift is provided at Gillespie-road Station, where the line is near the surface, and at Holloway-road a double spiral moving track travelling at the rate at 100 ft. per minute has been installed as an experiment in one of the lift-shafts.

Taken all round, the construction and equipment of the new tube give ample evidence of the desire to place at the disposal of the public a railway designed on the most approved principles and providing as far as is humanly possible for the safety, comfort, and convenience of passengers. We need only add the remark that these aims appear to have been adequately realised.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE usual fortnightly meeting of the Royal Institute of British Architects was held on Monday at the Rooms, 9, Conduit-street, when the chair was taken by Mr. T. Collcutt, President.

The Secretary reported that the following gentlemen had been elected that afternoon honorary corresponding members of the Institute :—

R. Böker (Imperial Society of Russian Architects), St. Petersburg
L. Bonnier (President of the Société des Architectes diplômés par le Gouvernement Français), Paris
F. M. Day, Philadelphia, U.S.A.
Jean-Joseph Caluwaers, Brussels
M. E. Cannizzaro, Rome
Cass Gilbert, New York
H. Helmer, Vienna
Virgil Nagy (Building Councillor to the Kingdom of Hungary, Professor at the Hungarian Technical University), Budapest
G. Harmand (Avocat à la Cour d'Appel), Paris
Ludwig Neher, Frankfort-on-Maine
G. B. Post, New York
J. M. Poupinel (Architecte diplômé par le Gouvernement Français), Paris
A. Salm Ghzn, Amsterdam
V. Terra, Lisbon
Don Fernando Arbós y Tremanti (Member of the Academy of Fine Arts, Inspector-General of Works at the Ministry of Fine Arts), Madrid
G. Wickman, Stockholm.

Sir Aston Webb's Portrait.

Sir Wm. Emerson said it was his pleasurable duty to ask them to accept, on behalf of the subscribers, the portrait of their Past-President, Sir Aston Webb. His activities were well known to all of them, and nothing he could say would be new. Sir Aston Webb commenced by taking an interest in the Architectural Association, and his activities took various forms in connexion with that Association, ending in his being President of it. He then became a member of the Council of the Institute, was afterwards Hon. Secretary, and later on President. During the greater part of Sir Aston's connexion with the Council he (the speaker) had the pleasure of working with him, and could testify to the very great ability he brought to bear on every question which came before it, and to his unfailing courtesy, thoughtful consideration of every detail, and tact and judgment on all questions. They knew as well as he did what a successful term his Presidency was. Sir Aston had since been elected A.R.A., and very shortly afterwards R.A., and his activities in connexion with the Academy were as great as, if they did not exceed, those he showed in the Institute. It might seem superfluous for him to say anything about Sir Aston Webb's work, but there were a few things he would like to mention. There was the large hall of the Birmingham Law Courts, which was magnificent in proportion and as beautiful in detail, and as successful a modern work as any which could be pointed to. Then there was the charming life assurance company's office in Moorgate-street; the Victoria and Albert Museum, which was being gradually disclosed to view as the scaffolding came down, and the central figure of which bade fair to become quite a unique landmark in London; the Royal College of Science; Christ's Hospital; the Birmingham University; and the Queen Victoria Memorial, in regard to which Sir Aston was responsible for the laying out of the fine Processional-road. Sir Aston Webb's capacity for hard work, his industry, his constant kindness to the junior members of the profession, and his genial fellowship, had won his way to a place in all their affections. He asked them to accept, on behalf of the subscribers, the beautiful portrait which had been painted by Mr. Solomon, R.A.

The Chairman said it was a great privilege to occupy the chair on such an occasion, and to be the recipient of a great work of art on behalf of the Institute. It was an added pleasure when the work of art portrayed one of their most talented and distinguished Past-Presidents. They all knew Sir Aston Webb and his distinguished career, but beyond that he would like to add that all those who knew him felt that there was something more than his talents and career—and that was the personality of the man. He regarded Sir Aston Webb as an old friend, and as being a man who inspired affection in all those who had to deal with him. He endorsed all that had been said, and was sure the meeting would receive that valuable and beautiful work of art with acclamation. He had a letter from Sir Aston Webb that morning in which he regretted that he was unable to attend that evening. It seemed to be part of the programme, as it were, that the originals of the portraits presented should not attend on the occasion of the presentation, but he did not know why that should be so. At any rate, he would like to read a portion of the letter he had received, i.e. :—"I must say to you how much I appreciate the compliment (which the fact that it is a usual one to Past-Presidents in no way diminishes) that my portrait should be hung in such distinguished company on the walls of the Institute meeting-room where I have spent so much time, sometimes in friendly conference, and sometimes in friendly combat, but always enjoyably, and my only regret is that I have reached the stage when I must leave the arena, make my bow, and hang lifeless upon its walls. It is the fate of all, and quite right it should be so, and from our place of vantage on its walls I trust and believe we shall watch fresh and vigorous generations carrying on the work of the Institute with ever-increasing success, not weakly giving in to the clamour of every passing whim, but wisely steering a middle course with justice and foresight. Perhaps I may be allowed to say how admirably I think Solomon has fulfilled his task, and the obligation I feel under to him."

The Composition and Strength of Mortar.

Mr. W. J. Dibdin then read a paper on this subject, of which the following is an abstract :—

The author said that the composition of ordinary lime mortar in relation to the resulting strength is in the highest degree important. The by-laws of the London County Council regarding the composition of mortar merely specify that it shall be composed of freshly-burned lime and clean, sharp sand or grit without earthy matter, in the proportions of 1 of lime to 3 of sand or grit, but contain no reference to strength, leaving it to be inferred that, if the composition is within the strict definition, the strength must necessarily be practically constant—quite apart from the particular purpose for which the mortar is to be employed. Further, no "factor of safety" seems to have been considered; so that, whether the mortar is used for a 10-ft. wall or one of 100 ft. in height, the by-laws equally apply without any precautions.

The author proceeded to describe a series of experiments he had carried out on briquettes and blocks specially made for the purpose, the results of which clearly indicated the danger of mere composition safeguards. These results were discussed under the following headings :—(1) Effect of washed sand of varying degrees of fineness; (2) effect of varying quantities of clay added to the sand; (3) effect of washing out the clay naturally present in sand; (4) effect of varying the time when the mortar was used after being first made; (5) strength of raw materials employed; (6) effect of the variation of the percentage of voids in the sand used; (7) effect of composition on spalding.

The results of the tensile and crushing tests were shown in diagram form, the details being set out in a number of elaborately prepared tables. Diagram 1 showed that mortar made with the proportions of one volume of sand to one volume of lime with the sand unwashed as received had a crushing strength of 150 lb. per cubic inch. When the sand was increased to two volumes the

strength fell to 92 lb. per inch. With three volumes sand it was only 52 lb., and with four volumes 53 lb. This experiment clearly indicated that an arbitrary limit of 3 to 1 is unsatisfactory, as it would prevent the use of the "excess" of lime, which, in this case, gave three times the crushing strength of that obtained when the by-law proportion of 3 to 1 was employed. In all the subsequent sets of this series the sand was used washed and graded. The illustrative diagram clearly brought out the fact that when the proportions were from one or two of sand to one volume of lime the strength was greater than when three volumes of sand were employed in all those cases in which the sand was coarser than 1-50 in.; but when the grading was from 1-50 in. and below, the strengths of the various makes were practically equal—viz., from 58 lb. to 66 lb. per inch.

The tests for tensile strength were in the same ratio, and clearly indicated that with these particular sands an excess of lime in contravention of the by-laws was a distinct advantage.

The results given in a further series of tests showed the effect of time, up to eleven days, between the moment when the mortar was mixed and that at which the briquettes and blocks were prepared. From these it would seem that up to seven days there is an increased strength, but after that time—that is to say, after the mortar had once set—the effect of a second breaking-up was distinctly detrimental, although better results were even then obtained than at any time before the first setting. The strength at one month gradually rose to 116 lb. per square inch with mortar which had been mixed for seven days, and fell when the mortar had been standing for eleven days to 83 lb.

Summing up, in conclusion, the results of a fairly exhaustive series of tests, so far as the limits of the experiments extended, the author said it seemed certain that the strength of a mortar depends far more upon the physical character of the materials employed than has hitherto been fully realised. If the usual prescription of 3 to 1 be rigidly adhered to the mortar may have, in certain cases, only one-third of the strength of that which might be obtained with as widely varying proportions as five of sand to one of lime; and it would appear to be desirable that the strength as ascertained by crushing should be the criteria rather than by arbitrary proportions. The tests can be made with great facility, and should be employed in all cases. The author said he must not be taken to suggest that any and every admixture should be sanctioned; but where the materials are clean and sound and free from dirt (such as unwashed road sweepings, dustbin refuse, old mortar, etc.), no unreasonable objection should be taken to their use, provided that they yield a mortar having strength sufficient for the work in hand. If a factor of safety of five were sufficient for any work it was obviously unnecessary to ask for one of ten, as the strength upon that basis must necessarily increase with the increment of the load. On the other hand care should be exercised to secure such factor of safety as may be required in any particular case.

It was a common practice to add to the sand hard clinkers crushed in a mill, sometimes in even equal quantities. Experiments conducted on the same lines as those described by the author confirmed the general conclusions in regard to fineness—varying quantities of sand and grit to lime, etc.—and show that mortars made with good hard clinker and sand may be used with safety.

Mr. Searles Wood, in proposing a vote of thanks to the reader of the paper, said that so far as he could gather from the American experiments, the addition of clay to the sand in 1 to 1 mortar had made no improvement in the mortar, but that in mortars of 1 to 3 and 1 to 4 there had been an improvement. But the general results of Mr. Wheeler's experiments were that it was impossible to make a general statement, either to the effect that clay was beneficial or detrimental to cement mortar. Mr. Dibdin said that 1 to 3 was an absolutely arbitrary proportion, but he believed that it was the minimum proportion, and no one would be prosecuted for an excess of lime. He had carefully examined Mr. Dibdin's tables, and in the second series which dealt with crushing strength at one month they would find that the 3 to 1 mortar gave a fairly regular line. If they looked over the other series—the 2 to 1 or the 4 to 1—they would see that he came to $7\frac{1}{2}$ per cent. of added clay, and instead of going in a regular curve there was a serious drop and then a rise to 10 per cent. He could not help thinking that in that series of experiments there must have been some accidental conditions which had interfered with the results, for it was not in the course of nature to have a sudden drop in that way. With all due deference to Mr. Dibdin's experiments, he felt he would like to have another series to check those referred to. With regard to the question of the admixture of clay with sand he was very glad Mr. Dibdin had made such a special insistence on the fact that it was pure clay which he added, because there was another class of experimenters—the jerry-builders—who made their mortar with more or less dirty sand and carried out experiments in bulk. They would all agree in saying that the result of this class of experiment had been disastrous. Before giving his adherence to Mr. Dibdin's experiments he would like to see them carried a great deal further. They were, however, greatly indebted to Mr. Dibdin for bringing the matter before them, because it was one they had very much at heart, but in order to get anything like confidence in the use of these materials they must have a little more assurance on the point. It seemed to him that Mr. Dibdin did not consider that the addition of clay gave any chemical difference to the mortar, so that really the only value of the added clay would be to increase the density of the particular mortar, and hence give additional strength. It really came back to this, that the whole value was to have the aggregate they mixed with their lime of a sufficient variety of sizes. There were one or two other interesting points he would like to have drawn attention to, and one was Mr. Dibdin's very clear description of the means of measuring voids in sand. He did not know whether any of them had tried experiments on the subject, but it was extremely difficult to accurately gauge what the voids in sand were. From the description which had been given he thought in the future they would be able to carry out their own experiments on that subject. Mr. Dibdin suggested that the by-law should be drawn with regard to compressive strength of mortar rather than to the proportions. The drawback was that it necessitated a separate experiment every time they questioned the strength of the mortar on the job, and that meant a delay of at least eight days. Another thing was that the specification was the direction to the contractor, and the contractor handed the specification to the foreman, who gave instructions from that specification to the particular labourer who was to mix the batch of mortar, and he would not have the slightest idea of what was meant if he was told it was to have a compressive strength of so many lbs. to the square inch. At the same time, they were indebted to Mr. Dibdin for bringing the matter before them, and they hoped he would carry on the experiments further. As that was a question which was of interest to all of them, it seemed to him it should be an obligation on the part of the London County Council or the Borough Councils to instruct a chemist like Mr. Dibdin to conduct a series of experiments on the local materials in the various districts, so that the results might be available for those who went to any district to carry out building operations. It might take the nature of a sort of bureau of information, and when a person went to get the by-laws at the County Council he could ask what the nature of the local sands was. Then he might be able to obtain the analysis of the amount of clay in them, and be able to gauge the proportion of lime which would be wanted. It appeared to him that no properly constituted ratepayer could object to such an expense as that. Mr. W. Dunn, who took great interest in the matter, had sent him a communication in which were some very valuable results, and with the Chairman's permission he handed that in, so that it might appear with Mr. Dibdin's paper.

Mr. W. Woodward, in seconding the motion, said that any proposition which would destroy the cast-iron effect of an Act of Parliament commended itself to him, and therefore when Mr. Dibdin told them that in place of the hard-and-fast 3 to 1 of the London County Council by-law they might speak of 5 to 1; when he told them, what he had often seen in his own experience, that the addition of clinkers added to the strength of mortar; and when he told them that it was not so much the admixture of the mortar as its ability to resist compression—these were things which must commend themselves to every practical man in the room. He sincerely wished that Mr. Dibdin or some member of the Institute would experiment not too much with briquettes, for such experiments he did not think were sufficiently practicable for architects to place sufficient reliance upon. He would like to see experiments made on *walls*, and they might find out the effect of the strength of mortar with washed sand, with unwashed sand, when it was made in a mill, when mixed with slack lime, when mixed with unslaked lime, the strength of the mortar on various thicknesses of joints, the effect of mortar on wire-cut bricks and other bricks, the effect of frost on various mortars, and so on. If they could get experiments of that sort in *walls*, and each took note of the effect of mortar as they found it in their own experience, then he was sure that information would be of a great deal more value to them than tests made on briquettes. He knew the difficulty of doing it, but every member of the Institute might contribute most valuable information if he would take the trouble in his architectural experience to note the effect of the strength of mortar in the various ways he had referred to.

Mr. Max Clarke said the paper appeared to him to be just what was wanted at the present time. They had been from their grandfathers' and great-grandfathers' time using the 2 to 1 or 3 to 1 proportions of lime and sand as the right and proper proportions, without knowing exactly why, but simply feeling that that which their ancestors did was right and proper. He would like to add his quota of thanks to Mr. Dibdin, because it was a matter in which he had taken more or less interest for a considerable time. It appeared that the average architect when he put the clause into the specification satisfied himself with that, and did not exercise that supervision which was essential for good work. It was one of the essentials, at any rate, that mortar should not be made so hard and stiff as the bricklayer was so fond of using, and it was also essential, and more particularly with cement work, that the bricks should be properly wetted. He took it that the experiments of Mr. Dibdin were more or less the outcome of the case which was in the police-court some time ago. Although he was aware that Mr. Dibdin had been diving into the subject before that case, yet he had dived into it now with such effect that the by-laws, in London at any rate, would have to be revised. He was sorry to contradict Mr. Searles Wood, but it was equally against the law to make mortar in the proportion of 2 to 1 as it was to make it in the proportion of 4 to 1—that had been decided in the court. One thing in the tests under consideration which struck him somewhat, was that they had a series of tests carried out by one of the most expert chemists in that line, and the results showed such remarkable variations that one was naturally made to think that the average material in actual use varied, which was a difficulty they had to contend with on the works as well as in a laboratory. But if they had laboratory tests carried out with the greatest possible care showing such variations, what must they expect on a building where no care was exercised at all, because they must remember that was really the case? They had a man who was absolutely ignorant, and he was set to work to make mortar. He did it according to his lights, and the result, of course, was what one might anticipate. He would like to know what Mr. Dibdin meant by his "time of setting." Of course, experts in cement had a recognised method of dealing with what they called "setting," but it would be extremely interesting to find out what Mr. Dibdin meant by the time of setting. Mr. Searles Wood told them that to ensure the best results they must get a variable size of sand. This was all very well for the laboratory again, where they could screen

and sift these things and add a proportion of one size and a proportion of another size, and by that means they could avoid interstices altogether; but that was a practical impossibility on a works. Only that day he had on a work three consignments of sand—one was extremely coarse, one a sort of intermediate, and one extremely fine. He thought how nice it would be to mix the three samples up together and use them for mortar, but he firmly believed that if he had done so the coarse stuff would allocate one place to itself and the fine stuff another place, and more particularly would that be so if it was done in a mortar mill. Therefore it was one of those things one would like to think could be done, but which he was afraid upon the work was almost impossible. He would tell them why he thought it would be impossible. The building he visited that day was of considerable size, and had fire-resisting floors. He had considered the matter of fire-resisting floors very carefully for some time, and he set forth in the specification that it was to be a certain proportion of broken brick (broken to a particular size), a certain proportion of coke breeze, and a certain proportion of sand. When he got to the building he found that the man who was making the concrete had taken upon himself to make it entirely of coke breeze, because he thought the brick would be a disadvantage, as the coke breeze was rather large. That entailed taking out as much concrete as would cover the area of their present meeting-room, and would probably entail a loss of 250*l.* on the contractors. If that occurred in a perfectly simple manner, what must they expect in a matter much more complicated like mortar? Personally, for the London district at any rate, he thought Mr. Dibdin's idea about the way mortar should be tested was a most excellent one, because it was possible in London to know exactly the sort of lime and sand they were going to use, and, that being so, they should know exactly what the result would be, and so the testing would be a simple matter. To go on in the haphazard sort of way which the County Council liked them to go now was quite ridiculous. They knew that the Institute had a Mortar Committee, and Mr. Searles Wood was its indefatigable secretary, and he would like to move: "That this meeting is of opinion that the question of the composition of mortar is a matter which deserves the fullest consideration, and, with that end in view, the Council be asked to devote a sum of money for further inquiry into the subject." The paper that night had proved quite conclusively that it was folly for the architect to try and do this sort of work for himself. He could go a certain way and give the results of his experience in the work, but he could not give that absolute scientific knowledge, which was at the basis of all things. If they had not got that, they had not really got to the beginning of things, and would certainly never arrive at a definite conclusion. They on the Mortar Committee were in that uncertain state; they had found out a certain amount, but without money they did not know how to find out any more.

Mr. Alan E. Munby (Lecturer on the Chemistry of Building Materials to the London County Council) said that the chief difficulty in drawing conclusions from Mr. Dibdin's interesting experiments appeared to lie in the very large number of variable factors which were involved. Looking at the thing from the rather theoretical point of view, one might classify the necessary conditions which had to be complied with under eight or nine different heads. To deal with a few of the conditions under which mortar would harden, the initial hardening of mortar depended probably for the most part on (1) the extent of compression in the mass, such as may be caused by changes of volume produced on solidification; (2) the amount of evaporation which will result in a contraction, varying with the nature of the constituents; (3) the solidification attained; (4) the character of the crystallisation decided by the nature of the crystalline constituents, the quantity of water present, the solubility of the ingredients, their initial temperature, and the thermal disturbance caused by chemical reactions; (5) on the time of setting, which put a limit to the motion of the ions in solution. Again, the final strength attained must be governed by the cohesion of the particles, which would, of course, vary with their composition; and by the area of surfaces of different constituents in contact, their chemical nature, crystalline grouping, and interspaces—in short, by what was called adherence. Was it rational to expect that among such a wealth of variables any scientific results could be drawn directly from experiments which attempted to embrace so many simultaneously? It seemed to him that they wanted to go very much further back, and try and utilise some much simpler experiments before attempting to touch so many complex factors at one time. In the first place, they did not even know whether any chemical action took place between the lime and the clay added to the sand. They had been told that it probably did not, and on consideration it did seem improbable that clay—the last resisting remnant of disintegrated felspathic rocks which had, in a minute state of division, been suspended for so long in water (alkaline at least initially)—should be soluble enough to react with lime during the short interval before the tests. On the other hand, Dr. Alexander Scott said it was quite possible that some chemical action could take place, and by some recent experiments on American waters Mr. Headden showed that silica was much more soluble than is generally supposed. That, therefore, was a question which was not settled. What he would like to see would be some experiments undertaken on less ambitious lines to begin with. For example, the clay might be replaced by something entirely above chemical suspicion, such as platinum in a similar state of division. Again, a further effort might be made to separate chemical and physical effects by initiating experiments on adherence with fat lime mixtures. Briquettes of lime and shot in place of sand might lead to some information as to the effect of configuration and size of particles, which would then be under control. Something in the nature of a fat lime constant for subsequent deduction might possibly result. As to the setting of mortar when reworked, the supersaturation theory of Le Chatelier and Marignac might provide an explanation. These savants had shown that many bodies added in excess to water form supersaturated solutions, which deposit crystals after a small interval. As much lime remained unaltered in ordinary mortar, there seemed no reason why when ground supersaturation should not again occur on re-mixing. The subsequent loss of strength after a longer interval might be due to the formation of compounds which would be less soluble than lime, and would consequently produce less concentration in their supersaturated solutions if the rate of setting was not proportionately increased.

Mr. W. D. Caröe, in seconding the resolution of Mr. Max Clarke, said this was a subject in which he took an immense interest, and he felt that there was a vast amount of knowledge which they had yet to acquire upon the question. The paper told them all about mortar within a few days or a few months of it being put together, but he should like to know something about that mortar when it had been mixed for five, ten, or 100 years. After all, that was what concerned them. It was not what mortar was a few months after it was made, but what their buildings were going to be when they were handed down to posterity. It happened to be a considerable part of his small practice to have to do with ancient buildings, and he was constantly coming across all sorts of curious questions connected with mortar. He was bound to say that the conclusion he had arrived at was that nearly all the mortar made in the XIXth century was not to be compared for excellence to that made a good many centuries before. He could tell of numbers of instances where mortar made in the XIIIth and XIVth centuries and in the time of Sir Christopher Wren was infinitely superior in every way to that which had been added to it in the last century. Why was that? Presumably there was more science in the last century. He fancied that really the reason was that the men who made the early mortar were trained craftsmen with a tradition, and they had learned locally how the limes and sands in the local district were best put together, with the result that he had tried to describe. He would very much like to see some experiments carried out if possible upon the composition of ancient mortars to find out why they did seem to have been used without shrinkage, which was an exceedingly important point. He happened only last week to make a careful survey of St. Paul's Cathedral, and one thing which struck him more than anything else was that Sir Christopher Wren did manage to secure even for repairing work mortars which did not shrink and which adhered to both sides of the crack. One's experience of modern mortars, and certainly of modern cement, was that that was an almost impossible thing to secure, and he was struck with the remark of Mr. Dibdin when he said that one of the objections which there might be to the use of clay in connexion with sand was the shrinkage which took place afterwards in the mortar. He could confirm that from practical experience, because he had tried experiments on that point.

The resolution of Mr. Max Clarke was then carried.

The Chairman said that Mr. Caröe had spoken of the tradition that possibly was in the makers of mortar in the XIIIth and XIVth centuries up to the time of Wren, and possibly before that, and he personally believed that tradition had a good deal to do with it. He had lately been in the south of Spain, and had had occasion during the last few years to see mortar mixed there and to have a good deal of it pass under his inspection. He thought the Spaniards had known a good deal more about the mixing of mortar, and especially the mixing of mortar for plaster, than the English had, and that was possibly due to the tradition coming from the time of the Romans, through the Moors, and on to the Spaniards. It was their usual custom to run stone lime twice through the tubs, and then it was mixed with the sand. The sand was not washed in any way so far as he knew. It was allowed to remain at least a fortnight before it was used as a mortar for the building of walls. That was rather contrary to the usual English custom. He would also like to say a word on the question of using mortar, or lime, or cement in the way of concrete blocks. He believed, so far as they knew, that concrete blocks being used as masonry was a modern way of using it. But just outside Algeziras there was a very beautiful aqueduct believed to be built by the Moors 700 or 800 years ago. There it stood, the most picturesque aqueduct in the world. The piers were about 3 ft. 7 in. square, and they were built to all appearance of blocks of stone. He made some incisions, and he found that these blocks which he had taken to be stone were actually lime concrete mixed with the local pebble, and in a few instances bits of mortar. It was interesting to see how that had stood the weather and had answered its purpose.

The vote of thanks to Mr. Dibdin was heartily agreed to.

Mr. Dibdin, in reply, said the work had been a labour of love to him. It was not a new question with him, for he had had to do with mortars in many ways in his public capacity, and had followed the matter up with pleasure in his private capacity. The ramifications which kept showing themselves in every posible direction as one touched such a comparatively simple, unimportant subject as mortar was surprising. When they thought that they had lime varying from almost pure lime down to limes of 60 per cent., each having their own specific qualities for certain specific work, the complications which came in were simply bewildering, and the effect of using greystone lime, commonly called, with a fair percentage of soluble silica, compared with the use of fat lime, was so great that it was impossible to put the thing in the compass of such a paper. He did go into the question of how many experiments it would be necessary to make before they might hope to say they had really broken the back of the work. He saw 20,000 in front of him, and thought they had better get on with what they had. Mr. Searles Wood referred to the variable results given in the diagrams and tables, but he did not quite grasp what he said as to the results being necessarily variable. In dealing with small quantities of mortar under laboratory conditions, they must of necessity get varying conditions, and that was why he said he was glad the Institute had printed his results *in extenso*. That showed the errors which

might arise, and within what variations they might expect results, because, however excellent averages might be in their way, yet in certain cases they had to consider minimum. With regard to one point mentioned by Mr. Searles Wood as to the 7½ per cent. of clay showing a considerable drop in one of the factors, while some of the others went up, he would only say he would be pleased if he could be shown the way to make a series of three briquettes with such a thing a common mortar, and get absolutely the same results. He took Leighton Buzzard sand, and got results varying, roughly speaking, of about a strength of 75 lb., but when they had got their worst results with 17½ per cent. of clay, yet they had 125 lb. of strength, which was double the strength. That was his point—that the minimum in one case was the maximum in the other. Putting laboratory results on one side, and all the varying conditions which would arise, they had the broad fact that they could get double, to say nothing of three or four times the strength. When they took 10 per cent. of clay, they got a minimum of 175 lb. instead of 75 lb., which gave a gain of 100 lb. It did not interfere with his statement of fact that they did get variable results, for the fact remained that they got a gradual increment up to the point, which was a matter which, he submitted, was worth consideration. As to the delay on works by having such tests as he had proposed, that was not the point. If it was established by such tests as might be considered sufficient that certain materials which had hitherto been looked upon with suspicion might be used, then the architect and surveyor could say, "That is a good material and can be used." Whereas now materials might be rejected which would give better results than those accepted. As to the suggestion that an examination should be made by local authorities of materials, he could think of no more valuable suggestion. It did seem an extraordinary thing that in these days of scientific investigation there should be so many loose ideas with regard to the character and effect of using local materials. Why need they go miles and miles away to get something brought to them when they had got as suitable or a more suitable material under their feet? He had suggested in his paper that experiments should be made on brick walls. Nothing could be more interesting than the experiments which the Institute had already conducted into the strength of brick walls, but he felt at the time that there was one factor wanted, which was that further work might have been done in connexion with the character of mortar. As to the time of setting, his experiments were laboratory experiments, and they got a different time of setting when a small quantity only was made up. Probably his days with regard to that might be extended to three or four weeks on works. Mr. Munby's remarks were of extreme interest, and showed an acquaintance with the subject which he hoped to have the opportunity of discussing with him. He had already referred to the enormous number of varying conditions, and the silica reaction was one of those nice points which required a great deal of investigation, but he felt that it was altogether of too technical a character, from the chemist's point of view, to inflict upon that meeting. Even chemists were not quite agreed upon it. It was a thing which brought about all sorts of questions with regard to crystallisation and the behaviour of these crystals one to another; the question of saturation and supersaturation and resaturation of the mortar, and they got into complications which they were not in a position to discuss that night. At the same time, the importance of the question was not only admitted, but was one which he maintained required a good deal of work to be done upon it. As to the use of fat lime, he and Mr. Grant took some sand of a rather peculiar nature and heated it and used it for making briquettes, and they got double the strength. It showed a slight chemical difference, but the big difference was in the physical character. Mr. Caröe made a very interesting observation as to their knowing more about new mortar than old mortar. The question of old mortar was one which had interested him for a long time, but the difficulty was to get a large number of samples of old mortar which could be verified as really being old mortar and with regard to which an approximate date could be given. He would be personally grateful to any members of the Institute who could send him authentic samples of old mortar, and would do his best to make as complete an examination of them as possible and summarise the result. He was sure that this would throw much light upon the whole question. The silica in these old mortars presented a feature of great interest. It was a very difficult subject, because they had silica in new mortars, and it would be well to know how far on an average number of samples the soluble silica had increased with age. He was a little sceptical on the point as to whether it was such a very large quantity after all, but at any rate it was a point for investigation.

Public Officials as Architects.

The Chairman announced that the next meeting would be held on January 7, when an election of members would take place, and Mr. H. W. Wills had given notice of the following resolutions:—"(1) That the Royal Institute of British Architects considers it unadvisable in the interests of architecture that public officials should act as architects for public buildings; (2) that the Council of the Institute should obtain statistics of the sums paid to official architects, surveyors, and engineers and their staffs, with a view to instituting a comparison between such sums and the fees which would be paid to outside architects for similar work, in order that, if the latter charges compare favourably with the former, they should approach those public bodies who already employ, or are contemplating employing, officials, with a view to securing the abandonment of such a system."

The London County Hall.

Mr. Woodward said, if he was in order, he would like to ask the Secretary to afford him the earliest possible opportunity of directing the attention of the Institute to the terms of the competition for the new hall for the London County Council.

The Secretary said that if Mr. Woodward handed in his resolution the following morning it would come up on January 7.

THE ARCHITECTURAL ASSOCIATION.

THE usual fortnightly meeting of the Architectural Association was held on Friday last week at Tufton-street, Westminster, Mr. Walter Cave, Vice-President, occupying the chair.

The President.

The minutes were read and confirmed, and The Chairman said he had to announce that the President, Mr. R. S. Balfour, continued to make satisfactory progress. The President was decidedly better, and he looked much stronger, and was beginning to take an interest in things general, and the Architectural Association in particular. It was early to anticipate the President's return to his work, but it was very satisfactory to have such a good report.

Elections.

The following gentlemen were then elected as members, *i.e.*:—

W. H. Adams, Highbury
F. R. Hiorns, Charing Cross, S.W.
John Usse, Alexandria
H. A. Welch, Regent's Park
G. H. Ledger, Epsom
C. S. Mordaunt, Cranbrook
J. H. P. Fulford, West Norwood
B. P. Collin, Strathmore-gardens, W.
S. P. Bush, Teddington
Sir Chas. A. Nicholson, Bart., New-square, Lincoln's-inn, W.C.

Announcements.

The Chairman said he had to announce the donation of a large collection of photographs of Westminster Abbey which had been presented by Mr. S. B. Bolas, and a bust of Inigo Jones, presented by Mr. Batsford; and on his motion a vote of thanks was accorded to the donors.

The Chairman also made the following announcements:—

The first meeting of the Rifle Club in the New Year will be held on January 10;

A musical "At Home," in connexion with the Musical Society, will be held on Friday, December 21, at No. 18, Tufton-street, at eight o'clock.

On the same day an exhibition of students' work will be held from 4 to 8 p.m.

The Architecture of Sicily.

Mr. W. H. Seth-Smith then read the following paper:—

"Italy, as the grave of Classic and the birthplace of Christian architecture, will naturally be the first and most attractive influence to the architectural student, and having paid his homage to the departed Romans and Greeks, mastered the records of the infancy and adolescence of Byzantine and Romanesque from Constantine's conversion in the IVth century, and tried to unravel the tangle of styles and influences up to the Renaissance, he will be in a position to proceed systematically and thus intelligently to study the growth of Gothic art, its external formative influences, and its decline under the all-pervading force of the revival of the Classic spirit.

Nor can our travelling student intelligently enjoy this—the most delightful of his experiences—unless he has a sufficient grasp of general European history from the earliest Greek to the end of the XVIIIth century.

The loveliness of Sicilian scenery and climate is too well known to need description. Most travellers visit it for these reasons. These qualities will surely be no less enjoyed by the architect whose trained eye for colour and form and whose field of interest is made so much wider by the pursuit of his speciality. Sicily is beautiful indeed.

The rugged barrenness of the mountainous interior is in striking contrast to the undulating luxury of the sea coast along which, on the north and east of the island, the railways wind amid dense and continuous groves of lemon, orange, and almond trees, harmonising with the bluish-green sea. There are no fairer spots in the world than Taormina and Palermo.

Sicily may not be the best destination of a young student of architecture, on account of the very intricate problems its post-classic architecture presents. To the older architect, however, all this only intensifies the interest, and sets him to work till his mind is as tolerably clear as to the origin as his sense of beauty is awake to the charm of its wondrous buildings of the XIIth century.

May I add a warning to the student as to accepting even the best guide-books as authorities on the origin, history, or description of architectural works? In this instance let him read beforehand, and again on the spot, such works at C. A. Cummings's "History of Architecture in Italy," Fergusson's "History of Architecture," Baldwin Brown's "From Schola to Cathedral," Leader Scott's "Cathedral Builders"; and consult in the Institute Library such works as Gravina's "Il Duomo di Monreale," Delhi, Gally-Knight, Hittorff, Mothes, Sabazaro, Dautier, etc. I am, however, specially indebted to Cummings; I have not hesitated to quote freely from him where I could not pretend to his historical research nor improve on his terseness of general description. Mr. Banister F. Fletcher and others have also kindly allowed me to reproduce some of the plates from their well-known works, and Messrs. Walter Millard, Gerald C. Horsley, Phenè Spiers, and J. J. Joass have lent their colour sketches.

My object to-night is to give you, if possible, some views and particulars (without, alas! the wealth of colour) which, when you visit Palermo, may make it somewhat easier for you to pursue your studies.

The Early History of the Island.

Situated in the direct and only sea route from the east to west and northern Europe, Sicily was naturally among the earliest lands to be colonised. Moreover, its great beauty, its fertility, and good climate and strategical position made it the envy of all nations from the earliest Grecian era to modern time. It is not difficult, therefore, to explain why it has been termed "The Battlefield of the Nations."

Phœnicians, Etruscans, Greeks, Romans, Byzantines, Saracens, Normans, and Spaniards in succession have struggled in long and deadly conflict for supremacy over the fair and unhappy island, only, in most cases, to enjoy a brief or partial occupation.

If we expect to find many monumental evidences of these successive occupations we shall be disappointed, for with the exception of those of the Greek, Roman, and Norman periods scarcely any traces remain.

The classic Greek period of 500 years extended from 735 B.C. to 210 B.C., when the Romans finally conquered the island. Notwithstanding the obliteration of the vast city of Syracuse, we have important remains still standing of two fine temples (of Concord

and Juno Lacinia) at Girgenti and one at Segesta, all, however, bereft of their setting as the central or foreground objects in great and beautiful cities, and of the fine white plaster coating once adorned no doubt with colour. In their now dilapidated and fragmentary character, and with their coarse yellow stone facing, it requires a good deal of imagination to restore their primitive magnificence. To my mind the vast desolation of recumbent ruins of Selinunte are still more eloquent of the chequered history of these early Grecian colonies.

Of the scale of some among these temples an idea can be formed when I remind you that the cast of an abacus of a capital in the Palermo Museum is 12 ft. 6 in. square, and that the caryatid of Jupiter in his temple at Girgenti measures more than 24 ft. in height.

Fewer still are the evidences of the Roman dominion, which lasted 600 years, namely, from 210 B.C. to about 400 A.D. The Romans plundered Sicily of all its treasures of Greek art. The great theatre at Taormina is, however, mostly Roman. From Roman times until 535 A.D. the northern tribes held sway, when it was made subject to the Byzantine emperors, who retained it till they in their turn were conquered by the Arabs.

The Saracens.

In 827 Euphemius, the Byzantine Governor of Sicily, revolting against the Emperor, called to his aid in an evil hour a force of Mussulmans, whose predatory fleets had long infested the Mediterranean. Seizing their opportunity, they conquered Palermo four years later, and promptly established themselves as masters of the whole western half of the island, and before the end of the IXth century all Sicily lay under Mohammedan domination. The Arabs had thus an admirable base of operations for attacks on Italy, but, notwithstanding their rule of more than 200 years, almost the only genuine Arab monuments remaining are, I believe, the Baths at Cefalà and the gate of the town of Ortigia (Syracuse).

The Normans in South Italy.

In 1016 forty Norman knights, returning from Palestine, stopped at Salerno in South Italy, then in the hands of the Lombard rulers, and found the town hotly attacked by Saracens. Encouraged by their aid, the Lombards took heart and the Saracens were driven to their boats.

The Normans, ambitious of conquest in this fair land, made several expeditions which resulted in 1040 in their establishment at Melfit, and in 1053 they were confirmed in their possession of most of South Italy, under Robert Guiscard, one of the many sons of Tancred de Hauteville, of Normandy, and received the Pope's pardon. These rude warriors, who had not blushed in the beginning of their career to follow the trade of highwaymen, and were absolutely illiterate, here became the enlightened promoters of knowledge and progress, encouraging with enthusiasm at their Court and throughout their territories letters, arts, and science, without regard to differences of race or religion.

Sicilian Architecture.

We have very briefly outlined the history of the island of Sicily from its first colonisation by the Greeks of classic times to the fall of the western Roman dominion. From that time for about 400 years under the Byzantine rulers a close connexion existed between this island and the eastern part of the Empire. Count Roger, the brother of Robert Guiscard, finally completed the work of conquering the Saracens and inaugurated, in 1090, the most brilliant period in the history of Sicily. The population he found there was, as in South Italy, composed of Greeks, Lombards, Italians, Arabs, and Jews, who had enjoyed under Saracen rule an extraordinary measure of liberty, each race retaining its own language, and to a great extent its civil and religious customs. The official languages were Greek and Arabic. This tolerance was imitated by the Norman conqueror. The Greeks were still allowed to adhere to the code of Justinian, the Lombards to that of Rothario, the Saracens still took their official oaths on the Koran, and the Normans brought in the Frankish laws and customs. Roger set himself to work to pacify and develop Sicily as his brother had done in South Italy. He created the beginning of a civilisation which had no equal in Europe. He had as a foundation the Arab fineness and intelligence consolidated by 200 years of continuous enlightened administration. "Christians and Northmen adopted the habits and imbibed the culture of their Mussulman subjects. Nor did these Scandinavian sultans of Palermo cease to play an active part in the affairs, both civil and ecclesiastical, of Europe. As hereditary legatees of the Holy See they dispensed benefices and assumed the Mitre and Dalmatic, together with the Sceptre and the Crown. The commander of Roger's navy was styled Emir or Ammiraglio. The workers in his silk factories were slaves from Thebes and Corinth. His charters ran in Arabic as well as Greek and Latin. His jewellers engraved the gems of the Orient with Christian mottoes in Semitic characters. His architects were Mussulmans who adapted their native style to the requirements of Christian ritual, and inscribed the walls of cathedrals with Catholic legends in Cuphic language. The predominant characteristic of Palermo is Orientalism. The Saracens had their own quarters in the towns, and their mosques and schools. Count Roger found a machinery of taxation in full working order—a whole bureaucracy, in fact, ready to his use. In applying this machinery he became the richest potentate in Europe. In this Court life men of letters played a first part three centuries before Petrarch taught the princes of Italy to respect the pen of a poet."*

It is estimated that the Normans never formed more than one per cent. of the population, and these almost wholly a feudal aristocracy. Palermo had then a population of about three hundred thousand. Count Roger died in 1101, and was succeeded by his son Roger, the first King, who continued for fifty years the noble work of his father. During his reign peace prevailed and the arts were encouraged.

This tolerance, of the Saracens especially, is all the more remarkable when one recalls the fact that the Crusades, with all the animus they implied towards Mohammedans, were contemporary, but it also suggests the long and close contact of East with West which may explain in some degree the phenomena we are about to examine. Another point to bear in mind is that the second great period of Byzantine art was co-existent with the creation of these Sicilian monuments, that the mosaic decorations of such churches as S. Mark's, at Venice, were not yet completed, and those of the Church of the Saviour, Constantinople, and others at Jerusalem and Bethlehem, and the Church of S. Front, at Perigueux, were in progress.

The Early Churches.

The first Norman church, S. Giovanni dei Lebbrosi, was built outside the walls of Palermo as early as 1071 by Robert Guiscard during his long siege of the town. It is a basilican plan with arcades of round arches over octagon piers, fully developed transept, not projecting beyond the aisle walls, but rising as high as the nave; the central bay is covered by a dome.

The adhesion to the Roman basilican plan in this early case is explained by the fact that the Normans were, on the whole, loyal throughout to Papal authority and to the traditions of the Western Church.

When Roger, the first King, was firmly established and was crowned in 1130 churches began to rise all over the island. Those of most interest as illustrating this brilliant episode of European history are all in or near the capital city of Palermo. They group themselves into two divisions, according as their founders followed the traditions of the Continental architecture to which they were accustomed, or were governed by those of the native races forming the population. Several of the earlier churches are modified transcripts of smaller monuments in Syria, Greece, and South Italy—a Greek cross in a square with central dome, sometimes repeated in the adjacent bays, and with three apses on the eastern side.

The little church of La Martorana, commenced about 1129, well illustrates this type. From the roughly measured plan I made on the spot its original form is seen. Its author was George of Antioch, High Admiral of King Roger. The interior is a Greek cross divided into nine bays, the centre one covered by a high dome on an octagon drum with pointed windows, the transition from the square to the octagon being made by arched squinches. The four oblong bays are covered by pointed barrel vaults, the four square angle bays are lower and covered by groined vaulting.

Comparing this and other Palermo plans with some of the early Christian churches of Syria and Greece we can hardly doubt the source of their inspiration.

Here, again, are the three eastern apses, in the angles of which openings are set small columns of porphyry and Verde antique. The walls and vaults are covered with mosaics, many of them contemporary. One, probably the oldest in Sicily, shows the founder prostrate before the Virgin, who exhibits to Christ a scroll bearing these words, "O, Son of God, protect ever from all harm George, the first of princes, who has raised this temple to me from the foundations." The prevailing tints of the mosaics are blue-greys, greens, madders, and white. The aisle vaults are of a rich indigo blue starred with gold, a fine combination giving profundity and strength to the colour composition. The pavement is of beautiful mosaic in Opus Alexandrinum.

The tower is probably older, and is detached by about 50 ft. from the original church. It is in four stages, the lower two square and plain, the upper with round angle turrets, which may have suggested those of the Cathedral towers, and it was originally crowned with a hemispherical dome. The ornament, such as the billet or cushion moulding, is clearly Saracenic.

Close by is S. Cataldo, about contemporary. It is also a Greek cross in plan, the side bays being narrower, and the three bays of the nave are all covered by domes. The drums are pieced by eight simple pointed windows, and four small windows are set at the base of the dome itself. The domes, as in all the Eastern examples, and like all their fellows in Sicily are simple hemispheres without ribs or lantern. There is little or no abutment to these domes, and we may assume their builders followed the usual Oriental construction in which the joints are horizontal as far up the height as possible, and the material is reduced in thickness to a minimum at the apex. The side bays are all covered by groined vaults. Four serpentine columns with free Corinthian caps and varied bases divide the interior into bays. The aisle apses are formed in the thickness of the wall. Two steps lead up to the tribune.

S. Giovanni degli Eremiti, finished, like La Martonana, in 1132, has a different plan altogether. It is T-shaped and without aisles. The nave consists of two square bays opening into a square tribune. The transept arms, as well as tribune and the two nave bays, are covered by domes. The dividing arches are partly round and partly pointed.

The exterior is thoroughly Oriental, although not Saracenic. The domes are formed over squinch arches exactly like those of S. Cataldo. The tower is of the same date as the church itself. The plan is thoroughly Byzantine. Some of the windows are closed by bare plates of marble perforated with an Arabic pattern. The cloisters are small but beautiful—arcades of pointed arches on coupled twisted columns.

Another and most remarkable example of Byzantine arrangement and construction is the little chapel at Malvagna, near Randazzo. It is only 18 ft. square, and from three sides open semi-circular apses, covered, as usual, by semi-domes, which abut against and buttress the central dome, repeating upon a small scale that of Santa Sophia, at Constantinople.

In all these instances the Normans allowed their monuments to be built in the style and with the decorations familiar to the peoples they governed. The pointed arch here first introduced to them became general, but it was the arch of the Saracens, broad, high-stilted, and without mouldings, and had no relation whatever to the use of the pointed arch of the North of Europe, which was even then beginning to be introduced into the Monastic architecture of Italy. Nowhere in Sicily is there any instance dating from this period of an interior which has any hint of a structural Gothic system. The use of the intersecting vault is confined entirely to the small bays of the aisles or porches, while the naves, where not domed or covered by the equally

* John Addington Symonds.

Oriental stalactite ceiling, are invariably covered with an open timber roof.

The Capella Palatina.

At the same time King Roger was building in the Royal Palace of Count Roger, his predecessor, a chapel whose general plan was more in harmony with the tradition of Italy, and which furnished the type of most of the later churches of the Normans. The Capella Palatina is, as we see it to-day, substantially the chapel King Roger consecrated in 1140, and is one of the most interesting and valuable monuments of the splendid architecture of the Norman kings. The chapel is entered from the arcaded gallery surrounding the court on the second story of the palace. Its plan is divided into nave and aisles, with transept as high as the nave, but with no projection beyond the walls, and three apses, as in all the earlier churches, the crossing covered with a Byzantine dome like many of the Romanesque churches in both the north and south of Italy. It is only in the treatment of its details, in the use of the pointed arch, and in its sumptuous decoration that we feel the influence of the mixed Orientalism which coloured all the art of Sicily at this period. The nave arcades are of highly-stilted arches with columns alternately of polished granite and marble, with Corinthian capitals. The height of the arch is nearly as great as that of the column, and the stilt nearly half its height.

The four columns which support the dome are of unequal diameter, and form not a square, but a rectangle, longest by about 4 ft. in the direction of the nave; the base of the dome at two points thus falls some 2 ft. inside its supporting arches, the wall being corbelled forward to carry it. The shadow thus produced as seen from the nave and softened by the rounded surface of the corbel is very effective. The dome resembles many of the smaller churches, and has a ring of small windows at its base. The transept aisles have barrel vaults, and the nave aisles are covered with wood ceilings following the line of the nave roof. The nave has a carved wood ceiling of the richest Moorish character, similar to those in Granada and Seville, and decorated lavishly with gold and colour. The interior surfaces elsewhere are flat, the arches without mouldings and the clearstory and apses without belt or cornice. But these flat surfaces are decorated throughout with the utmost splendour.

Even without their gorgeous colour the lighting of these churches would be fine. Here the windows of the clearstory and aisles, of nave and transepts, are so small as scarcely to be seen in perspective and to give depth and mystery to the ceilings and interspaces; these masses of deep dark and half-tone being repeated beneath the ambo and organ gallery and in the semi-domes of the apses, while a flood of diffused light descends from the dome windows, forming a splendid contrast and throwing into high light the clergy in their sumptuous robes and brilliant accompaniment assembled below; their forms and colours being reflected, as it were, in the series of mosaic figures of saints and angels depicted in the mosaics above.

In no other interior which I have seen is this contrast of light and shade so fine, reminding one of the Spanish cathedrals, but the prevailing gloom of a nave so decorated would not have been justifiable in the Middle Ages, except in a private chapel.

The great principle of "breadth" is carried to perfection. I need not say that the glazing of the windows is quite without colour—another most important principle. Any stained glass would have confused the scheme of wall colouring. Everywhere the effort to obtain diffused rather than direct sunlight for the decorations is apparent. There are practically only two great divisions of the composition—the upper and the lower portions of the church, the upper being entirely covered, walls, arches, domes, vaults, and even soffits of arches, with a wealth of colour, the lower kept quite quiet yet sufficiently broken by line or colour (without pattern) to harmonise with the other portions. For instance, the mosaic pavement is comparatively cool and subdued and of geometric design; so is the frieze which separates the great vertical slabs of cipolino marble, 14 ft. high, from the pictorial mosaic above; these slabs being formed into panels by bands of geometric mosaic resembling those in the Egyptian and Spanish mosques, while the marble columns are enriched with fluting to harmonise with their richer-toned granite neighbours and other surroundings.

These wall pictures are of the greatest variety and beauty; the ground is all gold, and the figures have much expressiveness and dignity without the rigid formality of most of the Byzantine mosaics. Some are doubtless contemporary with the structure, but the greater part were added during the reign of William I., the son of King Roger, before the end of the XIIth century, and all have been more or less restored, as have also those of the Martorana and of Monreale; the madders in the draperies harmonising beautifully with the porphyry columns and discs. The inscriptions are in black, and are both in Greek and Latin, and silver tesseræ are used in parts. The silver band of the cupola bears the date of 1143.

The organ gallery is a beautiful composition in porphyry and serpentine white and red marbles, with gold glass, its design closely following the examples we find in Ravello and Salerno and other South Italian cathedrals.

Cummings speaks of a paschal candlestick of great beauty standing beside the Ravello pulpit. If more beautiful than that we have here it must be beautiful indeed.

The pavement is a very rich example of Opus Alexandrinum, consisting of circular slabs of porphyry with bands of colour.

In this lovely chapel Norman architecture in Sicily came to its full flowering. In later monuments we find equal magnificence, but nowhere more typical or more beautiful expression of the genius of the place and time.

The Mosaics.

Fergusson says: "The North needed acute brilliancy (of colour) as a contrast to external greyness. The South found rest from the glare and glow of noonday in these sombre splendours. Thus Christianity both of the South and of the North decked her shrines with colour. With the Greeks colour, though used in architecture, was severely subordinated to a calculated harmony with actual nature; it did not, as in a Christian church, create a world beyond the world, a paradise of supersensuous ecstasy, but remained within the limits of the known." ("History of Architecture.") Whatever our ecclesiastical views of the wisdom of the Emperor Leo the III.'s iconoclastic decree in the VIIIth century, as artists we cannot but rejoice that the Western Church retained her full freedom as to the use of colour and form.

In no spot in the world can the principles and methods of glass mosaic be more successfully studied than in Sicily; those at Santa Sophia are largely hidden from view behind Mohammedan whitewash or destroyed, and much at S. Mark's has been restored out of recognition or has given place to imitations of painter's art.

The decorators of the late period of the Roman Empire well understood pictorial mosaics in marble, and we have very beautiful examples in Rome of this work, for instance, in the apse of Sta. Prudenziana, executed in the IVth century.

The ground was then mostly in blue, very little glass was used, and the figures were thoroughly Roman in type. When the seat of Empire was transferred to the East in 330, Constantine's liberal patronage of the arts in Constantinople, and particularly of mosaic amongst so artistic a people, soon brought the beautiful art to perfection.

When in 402 Honorius again changed the capital to Ravenna this town produced the finest mosaics of the earlier period up to the middle of the VIth century. This century also saw the completion of S. Sophia. Although some good examples can be seen in Italy, proving its continuity with varying success, and in spite of the set-back resulting from the iconoclastic movement, it was not till the XIth and XIIth centuries that the great revival came from the East, of which S. Mark's and, a little later, those in Sicily are so eloquent. The earlier mosaic work in S. Mark's (late Xth century) is, however, hard and rigid in detail compared with that executed in the XIIth century in the same church, and at Torcello and here in Sicily.

These decorations of the Palermo churches represent the zenith of Byzantine mosaic art of the Second Period. Nothing finer had been done before, even at Santa Sophia or S. Mark's, Venice. Nothing so fine followed, and the ambition of the Renaissance painters to reproduce their naturalesque art in this permanent form, thus divorcing it from the conventional limitations imposed by the material, was soon to destroy its traditions and its practice. It is only in our day emerging into new life by the discovery of its true principles of design and method of fixing, and by the revival of the manufacture of the enamel-glass by such firms as Messrs. Powell, while Sir William Richmond, Messrs. Crane, Anning Bell, Clement Heaton, Spence, and others are working on the right lines, and already giving us good work, both internal and external, in spite of many adverse conditions. A school of mosaic workers is thus arising in England, which we anticipate will lead the art in Europe, and we may hope that before the Westminster Cathedral mosaics are commenced the empirical stage of the revival will be passed.

These Sicilian mosaics are kept sufficiently distant from the eye to prevent an unpleasant sense of the coarseness of the material and its joints, and to blend its irregular lines and surface into a rich and harmonious whole, full of variety and accidental beauty, while the scale of the figures and geometrical ornament is large enough to be read pleasantly by the multitude worshipping in the church. The lighting is arranged with great skill to answer the latter purpose, but is not sufficient to kill the colouring, and the windows, always of plain white glass, are generally in such positions as to secure diffused rather than direct light, and low down to give profundity and richness to the surface above.

The Byzantine style is the architecture best suited to the display of this decoration, since the curved surfaces of its domical vaults produce the maximum effect in graduation of light and shade, and the greater the width of the building the better is the effect. This explains the supremacy of Santa Sophia at Constantinople.

Mr. Anning Bell contends that the stiffness of drawing is not archaic, but the expression of the material, and says, moreover, that play of facial expression and momentary gesture are out of court, and that such subjects as depend on these are unsuitable. The characters should be types and the incidents symbolic. Mosaic can be magnificent and splendid, but not humorous. A row of Popes is meant not for likenesses of individuals, but to impress the spectator with the continuity and power of the Papacy.

The method of execution employed in Sicily and elsewhere in mediæval times was as follows:—A coat of fine lime mortar was spread on the wall, upon which, when fresh, the picture was broadly painted in fresco in the proper colours. The painter was immediately followed by the mosaicist with the cubes, which were embedded in the soft mortar and pressed to an even surface.

Here, as in the interior of S. Mark's, Venice, the decorations enjoy the necessary freedom from rivalry with architectural features, such as mouldings and stone enrichments, which disconnect the scheme and look poor and mechanical in juxtaposition, unless the carving is of very special delicacy to harmonise, as it does fairly well, for instance, in S. Vitale at Ravenna and in the atrium of S. Mark's, and as it does *not* at St. Paul's, London. In these Sicilian Norman churches the mosaics cover the entire wall surfaces, domes, and vaults, and even the angles of the archivolts are all rounded off to carry it to the soffits of the arcades. Even the wall surfaces were not flat. The ground is modern mosaics, but low-toned, soft, rich, never flashing, full of play of colour from pale lemon to rich orange (according to its lighting)—and the decorative designs are bright in tones that do not give the effect of patches of dark on a light ground.

The pallete used is a very limited one—greys and grey-blues, violets, soft greens, madders, with scanty use of silver, dark reds, and russets; in fact, Nature's scheme of colour at her most beautiful and restful season of winter. A scheme deliberately adopted and perfectly adapted to the heat and glare of the climate.

The size of the cubes averages nearly 1 in. square for the larger surfaces and about ¾ in. for faces, hands, etc. The mediæval method of cutting up the cakes of enamel-

glass with chisel-like hammers produced the great irregularity in the cubes which, with their corresponding variety of joint and surface, gives such subtle charm to old work compared to the modern machine-cut cubes. It is obvious such a material must impose limitations on the drawing and texture.

Much valuable and practical information on ancient and modern mosaics will be found in three papers, by Messrs. Harvison Townsend, Anning Bell, and Clement Heaton, in the *Journal* of the Royal Institute of British Architects for March and November, 1901, and April, 1902, besides, of course, the larger standard works.

The cathedrals of Messina and Cefalù are both nearly contemporary with the Capella Palatina, both having been commenced by King Roger about 1130. Of the former only the general plan and the mosaics of the three apses remain substantially as they originally were. The basilican plan has the usual characteristics of the Norman Sicilian cathedrals. Saracenic influence is shown in the slightly horseshoe form of the nave arches.

Cefalù.

Cefalù is a church of great interest. Here is the south Italian porch in three vaulted bays between two angle towers. The nave arcades are high-stilted on columns of polished red granite, with white marble bases and varied capitals, many from older buildings. The clearstory, as at the Capella Palatina, has a single-pointed window over each arch. The transept projects beyond the aisle walls; the central bay was domed, though now ceiled by wood beneath. From the east wall of this transept open three very deep tribunes, the central one covered by groined vaults, and each ending in an apse, as usual. The Lombardic open arcaded gallery on three sides of the transept, and just beneath the vault with small round arches, is the only example of this feature in Sicily. The most striking feature of the church is the very lofty choir opening into the nave. There is nothing like it south of the Alps.

I reproduce a measured plan and elevation of the apsidal end of this church from Mr. George Hubbard's paper read before the Society of Antiquaries, and published in *Archæologia*, Vol. LVI. He has established the date of commencement as being 1132 and of the completion of the nave roof as 1160. He also suggests the interesting theory that the occasion of the marriage of the daughter of our Henry II. to William the Good, of Palermo, gives the clue to the origin of the earliest pointed arches in England, namely, those of Trinity Chapel and Becket's Crown in Canterbury Cathedral, then just commencing. The church possesses some fine cloisters, which he well describes.

The painter, Mr. A. Wallace Rimington, thus writes of the interior:—"The whole body of the church being white the eye is lead up to the choir. Once there it remains there, and dwells with intense satisfaction on the glorious wealth of colour with which the chancel is enriched by mosaics. These are, on the whole, the most impressive of any I have seen in Italy. The harmonies of colour are mainly in violet and brown madder, accentuated with low-stoned green and grey. The apse is entirely dark, except for one small glazed window, which brings a small quantity of high light into contrast with the principal dark of the church, and takes the eye at once to its central interest. In its vault, and just where the play of reflected light is at its best, is a great dominant half-figure of Christ, quiet, dignified, and splendid in subdued colour. Its effect at the end of the church is most impressive. Our Lord is raising the right hand in the act of benediction. Still the same Lord that looked down upon the generations who knelt in this great church all through the Middle Ages! It is difficult to believe that any one of that multitude could have entered the church without having gained some better idea of the love and majesty of the divine Master from this noble mosaic."

Palermo and Monreale Cathedrals.

An interval of nearly fifty years seems to have elapsed between the building of the churches already described and the two great cathedrals of Palermo and Monreale, the only additional examples of the splendour of the Norman church architecture in Sicily. These were built under King Roger's successors, William the Bad and William the Good. Palermo had a previous cathedral, begun in 1109 on the ruins of a Saracen mosque. A year or two after the accession of William the Bad Walter of the Mill became Archbishop and rebuilt the cathedral, leaving, however, some eastern parts of the old church. It was finished in 1185, and was doubtless one of the most beautiful in Sicily. The XVIIIth century transformation has, alas! left little or nothing except the general ground plan, and not all of that, a new east end having been built within the old. The plan is similar to Cefalù, without western porch and towers. The three tribunes are, however, here connected by a broad arched opening, forming them into a sort of second transept. The nave arcades were of pointed arches over four slender columns set in a square and joined by their bases and abaci into a singularly beautiful pier, and above the arcade the clearstory was pierced by three-light pointed windows divided by columnar mullions. The ceiling was of wood decorated with gold and colour, and the whole interior was magnificently enriched with precious marbles and mosaics.

The four slender towers, one at each angle of the church, are a unique feature, and although picturesque in general form they are unsatisfactory in detail, especially in the multiplication of coarse string courses running under each sill and at the springing of each arcade. The main angles are all shafted. Some of the stages had their surfaces inlaid presumably with black-and-white patterns in marble and asphaltum in Saracenic patterns, the incision now only remaining, and curious superficial Saracenic parapets occur over some of the string courses and dog's tooth ornament below them. The circular angle turrets commence about half-way up. The apsidal end is richly decorated with interlacing arcades of a superficial character enriched with inlaid patterns. We must not fail to visit the tombs of the kings in a chapel of the nave.

All this splendour remained till 1781, when the Royal architect, Fuga, in spite of the strenuous remonstrance of the Palermitan architects, ruthlessly destroyed it. The frigid silence of the Palladian style reigns within, simple indeed and dignified, but lifeless as the century in which it flourished.

The Cathedral of Monreale externally resembles that of Cefalù, with flanking towers at the west end and a deep porch in three bays. The southern tower has a low pyramidal spire. The external face of the south aisle shows a range of pointed windows surrounded by thin bands of mosaics, and united by broader flush arches enclosing circular patterns with horizontal bands. A frieze of inlay runs beneath the cornice. The clearstory is absolutely plain with an arched corbel-table under the eaves. In the east end the characteristic external decoration of the style is even more lavishly displayed than in the apses of the Cathedral of Palermo, and is certainly one of the most striking compositions in Italy. The entire surface is covered by a series of interlacing arcades of pointed arches. The upper stages are covered with geometrical inlay of marble and asphaltum, and the walls are further enriched by horizontal bands and circles of the same character. There are few exteriors in Europe possessing a surface decoration of equal richness.

Before passing to the interior something more should be said as to the bronze doors.

The art of casting in bronze had been a lost art in Italy for several centuries, but was revived by the Greek artists in the XIth and XIIth centuries, the earliest examples of bronze doors being those at Amalfi and Atrani, of the last half of the Xth century, and between 1066 and 1087 seven churches in Italy were thus furnished from the Byzantine capital. In most the treatment was large panels with various designs, generally simple, all executed in Niello, with incised lines filled in with silver, etc., the frame of the panels being more or less decorated. The bronze was in comparatively thin plates on a framework of solid oak. The Eastern inspiration was caught in time by the Italian workmen, the earliest being executed in Italy by Roger of Amalfi for the chapel of Bohemund about 1120. As subjects became more ambitious Niello decoration gave way to reliefs cast on the plate. In 1160 Barisanus made a magnificent pair of doors for Trani Cathedral, and somewhat later for the Cathedrals of Ravello and Monreale; the panels in all three are almost identical in subject and design, and are of prodigious variety, sacred and profane.

In addition to Barisanus's pair in the north doorway, Monreale possesses magnificent bronze doors in the west or principal entrance by Bonanno, the maker of the great doors of the Pisa Cathedral and the architect of the Campanile there. Though the two makers are almost exactly contemporary the work of the Pisan architect is archaic in style—the panels without mouldings; the sculpture of the panels is in very high relief and spirited in character. The work of Barisanus is more harmonious; the foliage, though rigidly conventionalised, is appropriate to its enclosing bands and carefully subordinated to the figure sculpture of the panels.

The interior is more fully windowed than the Capella Palatina, and its decorations are of surpassing magnificence. The scheme, both in subject and in general colour, is precisely that of the Capella Palatina, but the scale of the building and its breadth of treatment immensely enhance the effect. The walls throughout are here, again, lined to a height of 22 ft. with narrow vertical slabs of cipolino grey-and-white marble framed in borders of geometric mosaic work, and with a Moorish frieze in the same material. All the smaller surfaces, including the jambs of the windows, the bull-nosed angles, horizontal and arch bands, and the soffits of the arches, are of semi-geometric patterns, and the whole of the walls and apses are covered with pictorial mosaics, the subjects being scenes from the Old and New Testaments in horizontal ranges divided by bands. The whole semi-dome of the central apse is occupied, as at Cefalu, by a gigantic half-length figure of Christ, which dominates the whole scheme.

The beautiful carved caps of the nave arcade anticipate the best Renaissance capitals, but are not so suitable to the style as those of Ravenna, for instance, as supports the heavy stilt-blocks from which the square soffits of the pointed arches spring. Low-toned red lines mark apparent archivolts to the arcade, the band beneath the clearstory windows and the arches being treated with semi-geometric Byzantine, patterns of green-greys and soft russets and madders with a small amount of white. In the lower range figure subjects are grouped into the spandrels of the arcade, and the gold ground is well massed round them. The figure subjects between the windows are similarly treated, while the white guilloche in a continuous band just beneath the roof is filled with busts in white, indigo-grey, and a little red and madder brown. Generally speaking, the greys predominate in the figures, producing, broadly speaking, with the gold ground a palpitating surface of yellow and grey, than which nothing is more beautiful. The greens and blues are very grey, and the reds and browns also of a neutral tint and in small quantities to prevent a hot effect where so much yellow exists.

These greys are splendidly focussed at the east end by the indigo mantle of the colossal figure of the Christ. This mantle is thrown over a tunic of gold and madder red, the highest light being the linen wrapped about the neck and throwing up the head finely, the face being very pale and surrounded by dark hair and beard.

In these days of the universal knowledge of the Bible it is difficult to imagine the educational value to the illiterate multitude of this complete pictorial record of the evolution of revealed truth culminating and centred in this fine figure of our Lord.

The pavement of the nave is not so rich in line or colour, but only serves more effectively to concentrate the attention on the principal decorations. That of the chancel, however, more than atones for the plainness of its approach.

Little is left of the conventual buildings except the cloister, which was perhaps in its best state in respect of its mosaic and sculpture—the finest in Italy. Each alternate pair of the coupled columns have plain shafts, the others being decorated with mosaics in vertical flutes or spirals or chevrons. The capitals are infinitely varied, and wonderfully designed

and carved. At the angles of the cloister the columns are in groups of four and the shafts covered with reliefs of beautiful design rather Byzantine in character, while the capitals are still more elaborate. The arch heads are, like every other portion of this cloister, of extreme richness. The inner arch moulding, however, is the one inharmonious note, stopping abruptly, as it does, overhanging the abaci of the caps. This is evidently one of those errors which it is difficult to account for, as there is no evidence that this feature was not contemporaneous.

With the Norman work of the XIth and XIIth centuries the development of architecture in the southern provinces of Italy comes to an end. In the great Gothic movement of North Italy, in the greater Renaissance movement which followed it, the South had no part.

Of the remaining Palerman churches S. Francesco, 1302, and the contemporary S. Agostino are, as to date, Gothic churches with many Norman details, and are worthy of more attention did time permit. Then there is the late XVIth century church of Sta. Maria della Catena, of which I give a photograph of the front and a pencil sketch of the beautiful late Gothic interior. Here the columns of nave are of cipollino, black-and-white veined, red, and a grey marble, and all polished. The carved caps and bases are all white marble touched with a little gold, with good effect; the surbases are of hard limestone. The walls internally are faced with rich brown sandstone varied with yellow and grey. The effect of the three centred ribs to the barrel-vault of the aisles is exceedingly pleasing. The windows are all small and have no tracery. Grey marble bands follow the line of the arcade in the pavement, the remainder being squares of about 18 in. of greyish Sicilian marble. The triumphal arch finds its abutment in similar arches across the transept.

Renaissance.

Something might also be said of the Renaissance churches with which the town abounds, and of the rococco inlay decoration in marbles of many kinds—the whole producing a sense of ostentatious wealth and of riotous imagination totally at variance with the solemnity and dignity of public worship.

Domestic and Civil Architecture of the Norman Period.

Up to this time the only domestic architecture in Europe, with very rare exceptions, has been that of the military castles. But in Sicily the examples of the luxurious Arabs were too attractive, and the arts which had been so lavishly employed in the church were turned to account in beautifying and softening the domestic life. Palermo became a second Cordova with palaces, villas, and pleasure pavilions standing in parks and gardens, with fountains and statues. Only the Torre della Nuifa remains of the Royal palace, containing a large hall which still bears witness to the interior luxury of the King's house. Even as early as the first quarter of the XIIth century, the walls and the groined vault were all adorned with mosaics.

The Saracenic characteristics of the baths at Cefalà (about twenty miles south of Palermo) are, with alight modifications, those of all the Norman civil buildings in Palermo. The earliest were two pleasure palaces built by King Roger, about 1120, for use in summer and winter respectively. Of La Favora, the winter villa, little remains excepting the interesting little chaper. The palace stood within grounds planted with citrons, oranges, and palms, and the whole enclosed within a great moat in which floated the gilded gondolas of the king and ladies of his court. The summer palace, known as Minenio, was two miles west of the town.

The more familiar examples of this Norman-Saracenic style are the two palaces built by William the Good and William the Bad, the Ziza and the Cuba, in which the Normans adopted the Saracenic domestic architecture and the kindred arts, especially that of formal landscape gardening and the use of water.

The Ziza, built of ashlar brown stone with close joints, measures 115 ft. by 62 ft., and is 80 ft high. There are three nearly equal stories marked by small string courses. The central arch of the principal front is 30 ft. high, and the inner order is carried on coupled jambs of fine marble. In the lower half of each arch was originally a coupled pointed window with a smaller window between the arch heads. There was no seclusion of the women here as in the houses built by Arabs for their own occupation, and the wall was crowned by a parapet, the divisions of which were filled by Cufic inscriptions, and enclosed, as in the baths of Cefalà, between two horizontal bands of Byzantine carving.

The central arch leads through a vaulted vestibule into a hall about 22 ft. square, with a deep recess on each of the three sides. These recesses are covered by elaborate Saracenic vaults, as at the Alcazar at Sevile, and the Alhambra at Granada, and their walls were faced with mosaics and plates of marble. These decorations remain in part. The central hall and vestibule have the height of two stories. The space on the sides of the building is divided into apartments communicating with each other by ample staircases.

The palace stood in the midst of pleasure gardens. Opposite the main entrance was a fishpond surrounded by a square pavilion, which has now disappeared, like that of Cuba, which still remains.

The Arabic inscription on the parapet of the Cuba gave the date of the building as 1182. The planning of this Royal villa appears to have closely resembled that of the Ziza. Of the various pavilions adorning the grounds, La Cubola only remains.

A curious hiatus in the art of Sicily is the almost entire absence of architectural wrought ironwork of any merit, ancient or modern. The best I saw was in the screens between the chapels and the nave in the Cathedral of Ortigia (Syracuse). This is the more curious considering how beautiful is the ironwork used to adorn the axle-trees of the carts in many of the towns, notably in Palermo (where they are also profusely decorated in colour), and in Taormina.

The architecture of the Norman in Sicily covers a period of little more than half a century. Yet in that time it had exhibited a logical consistency and a wonderful union of strength and grace. Strictly speaking, the style had no development. No architecture ever expressed more fully and clearly the peculiar character of its age and people. The strength of the Norman, the fineness of the Greek, the luxury and grace of the Arabian were exhibited, not more conspicuously in the social and political fabric than in the churches and palaces the Williams left to their unworthy posterity.

Weary as we are all of the battle for the supremacy of the styles and of theories for the development of a XXth century manner of work, may there not, however, be fresh food for reflection in the cosmopolitan tolerance and studied collaboration which within fifty years resulted in the creation of the lovely architecture which has been our theme to-night? And since we have been so recently bade to "think Imperially," does not our Empire contain all the elements, if intelligently organised and sympathetically handled, for the production of something at least equally admirable? At the present moment an English architect is executing a commission in our richest eastern dependency which appears to offer a unique opportunity for combining the scientific genius of Europe with the splendour of Oriental taste in form and colour, in commemorating the reign of the best Monarch of the leading Empire of the world. It ought to rival, if not excel, the Raj Mahal."

Illustrations.

The following is a condensed list of illustrations shown by the lecturer:—

Maps of South Europe and of Sicily. Syracuse, Gate in Ortigia. Palermo, plan of S. Giovanni dei Lebbrosi; La Mortorana, plan, tower, interior. Cairo, Mosque of El Zahir, cushion mouldings, and zigzag. Syria, plan of Pretorium of Mousmieh. Phocis, plan of S. Luke's of Stiris. Palermo, S. Cataldo, plan, interior, and exterior; S. Giovanni degli Eremiti, plan, exterior, and cloisters. Malvagna, plan, elevation, and section. Palermo, Capella Palatina, plan, interior, pulpit, Saracenic ceiling, details of mosaics. Ravello, Cathedral pulpit. Cefalù, Cathedral plan, interior, exterior of apse, and porch; S. Clemente. Casauria, plan. Palermo, Cathedral plan, exterior, general view, apsidal end, details of west and south fronts, tomb of Roger. Monreale, Cathedral, plan, interior, general and transeptal views, apse, section of nave roof exterior, and of cloisters (ten views). Seville, Alcazar. Alhambra. Rome, S. John Lateran cloisters. Arles, cloisters and details. Palermo, S. Francesco, Sta Maria della Catena, two interior views and exterior. Olivella, church tower. Torre del Niufa, exterior and King Roger's private rooms, La Ziza, palace, plans, exterior and interior of hall; La Cuba palace and La Cubola (exteriors); Palazzo Chiamonte, window, Bridge of the Admiral, Archbishop's palace, Gothic window, Convent of the Pieta, Syracuse, Palazzo Montalto, Taormina, Baden Vecchia window. Caserta Vecchia, cathedral, transept, and lantern.

At the conclusion of the lecture Mr. Louis Ambler took the chair, Mr. Cave having to leave the meeting to keep another engagement.

Mr. R. Phenè Spiers, who proposed a vote of thanks to the lecturer, said there were many present who had a closer acquaintance with Sicily than he had, but at all events there was one claim to be heard that he could put forward, though it might not be a recommendation, and that was that he visited Sicily before anyone else in that room. It was in the month of May, 1864, that he was there and he retained a very vivid recollection of what he saw because the month was a sunny one, and he had just come from Rome, where for two months it had been very cold and continually raining. He was glad to find in looking at the magnificent series of slides and drawings which the lecturer put before them, that he recollected pretty well what he saw forty-two years ago, and there were some points in the lecture which he could substantiate. The lecturer appeared to be in doubt as to the Church of S. Giovanni degli Eremiti, Palermo, and he said that he was rather astonished to be told by guides and others that the church was built as a mosque. Mr. Seth-Smith had called upon him the previous Wednesday to ask his opinion, and perhaps the best course would have been to have replied, as they do in the House of Commons, that he should like to have notice of the question. When he was asked his opinion he had a vague recollection that some time ago he had come to the conclusion that, although one of the walls belonged to a mosque, the church itself was built entirely for the Christian religion. He happened, fortunately, to find a tracing which had been sent to him of a church showing the actual present-day church and the original mosque. When he looked out the tracing he found a letter which would explain matters, and which would be listened to, he was sure, with the greatest interest, for it was written by one whose loss they regretted very much. He should explain that two of his students at the Royal Academy, who were studying there at the same time, but who were not acquainted with each other, independently asked him whether he could find someone to travel with them, and, of course, he introduced them to one another. There were two singular points, *i.e.*, those students were both named Bedford, and their Christian name was Francis. One of the two was living, though he had given up architecture and had taken to illustrating books, and the other was the writer of the letter whose loss they all must deplore. It was Mr. F. W. Bedford who wrote him the following letter as to whether the Church of S. Giovanni degli Eremiti had any Moorish or Mahommedan construction in it. The letter was dated January, 1892, and was as follows: "Dear Mr. Spiers, the following is a copy of the notes I have of the Church of S. Giovanni degli Eremiti, Palermo. I give a key plan on the other side, but F.D.B.'s plan [Mr. F. D. Bedford, whose plan we reproduce] will give you the details. The present church is an addition to one of the Moorish mosques of which many existed in Palermo in the time of the Moorish Dynasty. . . . The original mosque consisted of one long nave divided into two by a central row of columns. The entrance was originally at C, approached by a covered way D. On the east side of the mosque is the road, and the jambs of the gate are visible at E. The covered way D probably continued at right angles to gate E. The external wall P was originally the external wall of the mosque and cloister. The Normans turned the mosque into a chapel and built a new church, B, using the external

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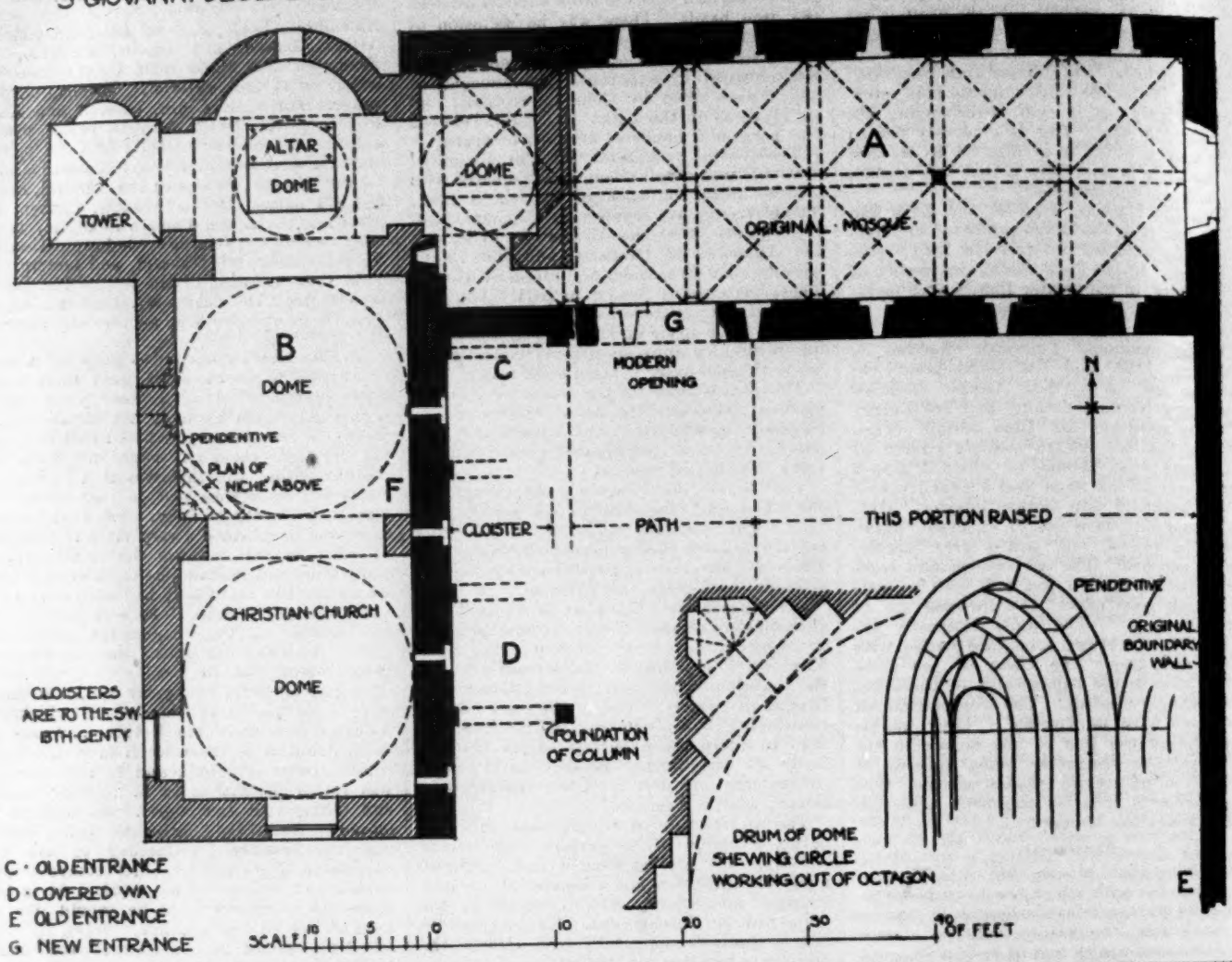

wall F of the original mosque as one of its chief walls. The columns were swept out of the mosque, together with the vaulting, and the floor was raised about 18 in., making it at about the same level as the new church. At the same time the mosque had a new wooden ceiling or roof put in about 5 ft. higher than the original vault. A door was placed at the east end into the road, and at G, the original door C being blocked up. Projecting into the old mosque, one bay of the arcade was the transept of the new church, corresponding to the tower on the west. . . ." This letter showed that Mr. Bedford gave close attention to every part of the building, and it was interesting to read the remarks in connexion with Mr. Seth-Smith's lecture. The next point was as to the plan of the Church of the Lepers, S. Giovanni dei Lebbrosi. He had a section of the church which he made from drawings furnished to him, and he had a section of another church, *i.e.*, the chapel of la Favara, near Palermo, which Mr. Seth-Smith said was the only portion of the Palace remaining, but there was a great deal more. The lecturer had not told them whether he went over the bridge of the Admiral. [Mr. Smith: I did not.] It was an extremely interesting example, and its value was that it was built in 1113, *i.e.*, about thirteen or fourteen years after the first Crusade. The arches were pointed, and there were two orders, the upper one projecting very slightly in front of the other, and there were square angles; all this was so exactly like what was seen in the Holy Land that he had always considered that the chief masons of the Crusaders' churches came from Sicily. They spoke Greek and Arabic, and would be able to give directions to the artisans who were there. In short, there was so much similarity between this bridge and the Crusaders' churches that he thought the pointed arch was introduced from Sicily into the Holy Land. He had two photographs taken by a brother of his which he looked up for the purpose of this discussion, and when he came to look at them he was puzzled to know what they were. He thought one was a church in the Holy Land, but it was a church, a very early one, at Messina, *i.e.*, S. Maria Della Scala, and it seemed to him to be one of the earliest buildings in Sicily, and the resemblance to the churches of the Holy Land put his suggestion beyond a doubt. As to the Church of S. Giovanni dei Lebbrosi, he had a photograph showing the interior of the dome, which was very similar to La Martorana. It had squinch pendentives of the same character as those which were to be found in the Eremiti church. The little chapel beyond the Church of S. Giovanni dei Lebbrosi was very interesting, and there was an astounding Palace, 150 ft. in length, still remaining, and quite ancient; but it was not easy to get at, as the place had been turned into a stable or tannery or something of the kind, and it was in a very unpleasant state. He came to the conclusion that the Palace was built after the chapel, and that when they built the Palace another dome was added on the top of the original dome. From Cumming's plan and from photographs, he had worked out the section, which showed that the chapel was thus increased in height. When he was interested in the subject of stalactite pendentives he thought that at la Zisa he might find some evidence in support of his argument, but he did not succeed. All the squinch pendentives were of Saracenic character—the form was that of the ordinary stalactite pendentives, but the squinch was different from any found in Europe. Mr. Seth-Smith had had the advantage over him in the matter of transit in Sicily. He (the speaker) had not been able to go much about the country, as it was not safe to do so at that time, whereas now the railway was available, and he hoped that many students would go there, as the attractions were so great. There was much to be learnt from the architecture of Sicily, and the scenery was very fine. The temples crowning the crest of the hill at Cefalu were of extraordinary interest and beauty. Their thanks were greatly due to Mr. Seth-Smith for his interesting paper and for the pains he had taken to illustrate it.

Mr. Ronald P. Jones, who seconded the vote of thanks, said the lecture might more properly be entitled "Mediæval Architecture in Sicily," for, though some illustrations of the ancient architecture had been shown, the lecturer had not dealt with that side of the subject. And yet it was of the greatest interest. With the exception of the Acropolis nothing could give one so fine an idea of what Grecian architecture must have been like as a visit to some of the Grecian temples in Sicily. The lecturer had dealt with Syracuse in a few words, and had said there was nothing left there but the theatre; but that was one of the finest Greek theatres we have, and Syracuse seemed to him to be the one town where you can get more idea of the classic Greek period than any place outside Athens, and the whole place was full of interest. He specially mentioned the Greek side of the architecture of Sicily because students might think, listening to the lecture, that there was little besides the mediæval work. That, of course, was not the case, and the classic side was of great importance. He emphasised what Mr. Seth-Smith had said as to the impossibility of showing in photographs the colour effect of these Sicily churches. The photograph of the interior of Monreale, for instance, was nothing but a diagram—a skeleton—and it conveyed nothing of the colour effects.

Mr. George Hubbard, F.S.A., in supporting the vote of thanks, said that though he had not visited Sicily as long ago as Mr. Phené Spiers in 1864, he had, perhaps, spent more time there, for he stopped nine months in the island during the year 1884. He thanked Mr. Seth-Smith for his most excellent paper, which so aptly dealt with the particularly complex period in the development of architecture in Sicily. He was grateful to Mr. Seth-Smith for having thrown upon the screen some drawings of Cefalù Cathedral which he (the speaker) made many years ago. In this Norman Cathedral of Cefalù, he considered that the earliest example could be found of the pointed arch in a purely Norman building. Sicily was conquered by the Normans in the

latter quarter of the XIth century. The conquerors were familiar with the pointed arch of the Sicilian Saracens, and they adopted it when building Cefalù Cathedral. The Cathedral of Cefalù was begun in 1132, and the pointed arch was used throughout, a full generation before it was adopted in any other Norman Church in Europe. In the year 1170 Henry II. of England offered the hand of one of his daughters to William the Good of Sicily. It was not, however, till 1176 that the little Plantagenet Princess, then in her twelfth year, was sent to Sicily. The wedding took place in the following year amidst unexampled rejoicings. An architect from Henry's Court would no doubt accompany the ecclesiastics and other dignitaries who joined the ceremony. But apart from historic occasions such as this, and another, less auspicious, which occurred in the following reign, when Richard I. captured Messina, there were plenty of facilities for English and Continental architects to become acquainted with the work of their brethren in Sicily. At this date, although some few pillars of the work at Canterbury had already been raised in their places, not a single arch had yet been turned, the whole of the upper portion having been executed between 1177 and 1180. This work at Canterbury is perhaps the earliest pointed Gothic to which an exact date may be assigned. It therefore seemed probable to him that Cefalù may have had a direct influence upon the introduction of the pointed arch in subsequent Gothic work. Cefalù was built by the first Norman King in Sicily, King Roger, and the subjection of the conquered race is typified, not without its pathos, by the four kneeling Saracens supporting the sarcophagus of King Roger, as was shown by Mr. Seth-Smith in one of the many and excellent slides.

Mr. A. Maryon Watson supported the vote, and said that anyone who set out to give in one lecture a history of the architecture of Sicily, would have to extend that lecture unduly, and no doubt that was the reason why Mr. Seth-Smith had confined himself to one period.

Mr. Gerald Horsley said he went to Sicily more to study colour, as an Owen Jones' student, than for any other purpose, but one could not help being interested in the architecture quite as much as in the colour. Of particular interest to the architectural student was the question of the construction of the pendentives of the domes, and Mr. Spiers had referred to the subject, and Mr. Jones had done so in a recent paper, in which he pointed out that the pendentive was formed exactly like a stalactite vault. As Mr. Spiers said, Sicily is the only place where this could be seen. A paper on the subject was read by Mr. Spiers at the Institute some years ago, in which the origin of the stalactite or honeycomb vaulting was given.

Mr. J. D. Crace said, as to the cushion enrichments round the arch, referred to by Mr. Seth-Smith, that was a notable feature in the whole of the exterior openings of the church of the Holy Sepulchre. That was a good deal earlier than the example from Cairo, which was 1270 in date, or 100 years later, so he did not think one need look to Cairo, which was only consequent; the *motif* was probably Sicilian. Another point was that the plan of the church of S. Giovanni dei Lebbrosi was almost exactly coincident with the plan of the little basilica at Ibreem, in Nubia, and which was given in Fergusson's examples, he thought. He should say that they were as identical as two plans could be, and that was interesting, as they were so far apart.

Mr. Wallace Rimington said he was not an architect, but the paper had given him a great deal of interest. It reminded him of four months he spent in Sicily ten years ago, when he revelled in the beauty of Sicily and its architecture. One missed the colour in a paper, for what one felt more than anything else in these churches was the beauty of the colour. Another matter which struck him was the extreme interest of the mixture of Oriental colour and influence with the Norman architecture.

Mr. Theodore Fyfe said he would like to assure Mr. Seth-Smith that the impressions he had given of the colour were very satisfactory; in particular, the cool tones in the Capella Palatina, Palermo. He would like to endorse what Mr. Seth-Smith and Mr. Hubbard had said about the very interesting church at Cefalu, which was certainly one of the finest Norman buildings in existence. It was almost inconceivable that the exterior of that church was, as Mr. Seth-Smith had said, contemporary with the Capella Palatina at Palermo. Sicily was full of such interesting contrasts. On the one hand there was the difference in size between the Capella Palatina and the cathedral at Monreale—the one a perfect gem, and the other just reaching the limit of size to which the style of architecture employed was applicable. Then, again, there was the contrast between that type of building, with its small, clear windows and wall space covered with colour, and the northern Gothic cathedral, with its plain stone wall spaces and windows filled with stained glass. Fergusson had said the latter was the best, but was it not doubtful, especially for small buildings? He had no doubt that Mr. Seth-Smith deliberately left the Classic work in Sicily out of his paper, because it was quite enough for one lecture to deal with the mediæval work; and he could not understand where Mr. Ronald Jones's sense of fitness had gone to, when he took the lecturer to task for not dealing more with the Classic work. He wished to add his tribute to supporting the vote of thanks.

The Chairman then put the vote of thanks, which was heartily agreed to.

Mr. Seth-Smith, in reply, said that if he could have put in colour with the rest, perhaps no one would want to go to Sicily, and that would be a pity. He had been particularly interested in Mr. Spiers' remarks as to the Eremiti church. He carefully studied that church, but he had not been able to understand it until he had seen Mr. Bedford's plan, which Mr. Spiers had shown. Time had not permitted his treating of the Classic period that evening, but no part of his study of the Sicilian architecture had given him greater pleasure than the Classical, especially what was to be found at Syracuse.

The Chairman announced that the next meeting would be held on January 11, when a paper would be read by Mr. Temple Moore.

The meeting then terminated.

FLUELESS GAS STOVES.

THE subject selected for discussion at the sessional meeting of the Royal Sanitary Institute on the 12th inst. was "The Advantages and Disadvantages of Heating Buildings by Gas Stoves of Various Types." The discussion, in which several prominent medical men took part, was, however, mainly restricted to the merits and faults of condensing gas stoves of the flueless description, for no one seemed to have anything but commendation to offer for modern open gas fires when properly connected to a suitable flue.

The discussion was opened by Dr. Samuel Rideal, who read a short paper based upon an investigation with flueless stoves which he has recently conducted. Briefly stated, Dr. Rideal's paper tended to show that the products of combustion from a flueless gas stove, and especially from a flueless gas stove of the condensing type, are harmless.

Some of the statements in Dr. Rideal's paper were severely criticised by some of the speakers, but we noticed that all the criticisms were based upon theoretical considerations, and that no specific case of injury to health caused by a flueless gas stove was quoted. Incidentally, striking evidence was given by one or two of the debaters which proved the absurdity of the doctrine that when the proportion of carbonic acid in air rises to five or six parts per 10,000 that air becomes unfit for inhalation. Although that was commonly accepted as a true doctrine some twenty years ago its falsity is now becoming generally recognised.

For the most part the discussion circled around the following concluding paragraphs of Dr. Rideal's paper:—

"We can therefore say that a flueless stove, although imperfectly condensing, can under such conditions be utilised, and that the only determining factor is the carbonic acid content of the room, which will be determined by the volume of the gas burnt and the natural ventilation conditions of the room itself.

Pure carbonic acid contents of sixty volumes per 10,000 are not poisonous, and it is only when 300 volumes are reached that respiration becomes slightly deeper and more frequent.

Reductions of 5 to 6 per cent. in the oxygen content of the atmospheric air also do not seem to have any permanent injurious effects. Such an alteration in the content of oxygen is comparable with that in the amount of inhaled oxygen which may be caused by changes in the atmospheric pressure, and even if accompanied by a low barometer the volume of oxygen per cubic foot of air in such a room would still be greater than that at common mountain altitudes.

If the suitability of a room for habitation depends on the relation of the humidity to temperature these factors are controllable by most forms of condensing stoves.

That gaseous carbonic acid cannot be regarded as an offender is well seen in the recommendation of the Departmental Committee on the Ventilation of Factories and Workshops, where a higher limit of carbonic acid is suggested for gas-lit factories than those in which no such lights are burning. It is pointed out in that report also "a moderate increase in carbonic acid and diminution of oxygen in the air is not in itself prejudicial to health." Since the above was written the Coal Smoke Abatement Society have published a report on twenty-five different makes of gas stoves (*Lancet*, November 17, 1906), in which it is concluded that "with plenty of ventilation the flueless condensing gas fires would be very suitable for warming rooms or passages." I am inclined to add that, from the considerations I have put before you, flueless gas stoves, especially those of a condensing type, are also indicated as an aid to defective ventilation."

Mr. T. W. Aldwinckle, F.R.I.B.A., was unable to be present, but sent notes, which were read by the Secretary. Mr. Aldwinckle agreed that flueless gas stoves were suitable for use in halls and passages; but, in spite of Dr. Rideal's figures, was dubious as to whether the products from such stoves when used in ordinary dwelling-rooms would not be detrimental to health.

Dr. Bostock Hill differed from Dr. Rideal in most of his conclusions. We must not, he said, give up sanitary principles because they happened to be inconvenient; and carbonic acid, even when not the result of respiration, will have a serious effect upon health. Further, there is no evidence that we can continue to exist with less oxygen. Dr. Rideal's ngures dealt with a room of 4,000 cubic ft. capacity, but bedrooms are not usually of that size, and in smaller rooms the stove would be responsible for a greater degree of pollution.

Dr. Des Voeux was inclined to agree with Dr. Bostock Hill that an increase in the proportion of carbonic acid in conjunction with a decrease in the oxygen in the atmosphere would be prejudicial to health.

Dr. Lyon said that in soda-water factories the operatives work in an atmosphere containing up to 5 per cent. of carbonic acid (500 volumes in 10,000) before they begin to faint. The victims in the Black Hole of Calcutta were said to have been asphyxiated, but they really died from ptomaine poisoning, or "spirotoxin" poisoning.

Dr. Hurtley said that he had worked for a considerable time in an atmosphere containing fifty-eight parts of carbonic acid per 10,000. The carbonic acid had been generated by a gas burner, yet he had suffered no inconvenience when working in that atmosphere.

Mr. Goodenough (Gas Light and Coke Company) said that the complaint that a gas fire gave a dry heat was due to the room becoming stuffy from want of ventilation. Opinions might differ as to the desirability of obtaining an increase in moisture as the temperature of the room increased, for it is well known that a dry heat is more tolerable than a moist heat.

The Chairman (Colonel Lane Notter, M.D.) considered that little attention need be paid to the amount of carbonic acid generated by the gas, but the effect of moisture in the atmosphere is a question which should receive serious consideration. In a place like Singapore, for example, the evil influence of an excessive quantity of moisture in the atmosphere is very apparent.

The majority of the speakers condemned the use of flueless stoves in bedrooms and dwelling-rooms, while admitting their usefulness and suitability for warming passages, halls, and shops. That is, we think, the reasonable view. It is easily possible to exaggerate the evil of the influence of the products of gas combustion upon health, but, taking into consideration the possibility of the presence of the products of incomplete combustion through the use of a dirty or defective stove, we think that the proper course is to discourage their general use in bedrooms and badly-ventilated dwelling-rooms.

THE POST OFFICE LONDON DIRECTORY.

We have received from Messrs. Kelly's Directories, Ltd. (High Holborn, W.C.), the Post Office London and County Suburbs Directory for the ensuing year. The work, which forms a complete and reliable directory of the City and County of London, can be had in one or two volumes, or the London Directory can be had by itself without the County Suburbs, and in any form the work is so comprehensive, well arranged, and edited that there appear to be few, if any, means by which it could be improved. Some users of the Directory no doubt find the combined work cumbersome, but they would probably readily admit the great convenience of having in one volume a directory which not only deals with the area covered by the London Post Office Directory, but which extends to the extremity of the county of London; but should the inconvenience of size outweigh the convenience of reference, the work, as already stated, can be had in separate parts.

The Directory, the present issue of which is the 108th edition, contains an excellent map, mounted on linen, which is clearly printed and reliable—as, indeed, is the whole work. The Directory is well known and indispensable to professional and business people and others, and it deserves to be.

PLANNING OF SCHOOLS.

The following report of the Education Committee of the London County Council was submitted at the meeting of the Council on Tuesday:—

"We have considered the question of the general principles to be adopted in planning public elementary schools, regard being had to securing (i.) that the most economical and effective use is made of the accommodation provided in the schools, and (ii.) that the buildings shall be planned to the greatest possible advantage from an educational standpoint.

In the course of our deliberations we have been impressed with the fact that it is wasteful to provide at a cost of about 20*l.* per head on an average a large number of places in classrooms which, from an educational point of view, ought not to be, and, as a matter of fact, are not being fully used. We have been furnished with exhaustive reports upon the organisation of schools of various types and sizes.

In dealing with plans of new schools and enlargements of existing schools, it is necessary to bear in mind the actual number of additional places required in order to show that there is a place for every child likely to be in attendance at any one time, and also to secure that the number of places provided in each school can be distributed among the several classes consistently with a definite number of children passing annually through them during the range of age of compulsory attendance.

There are two obvious considerations which affect the maximum and minimum dimensions of classrooms, namely: (i.) The maximum number of pupils with whom a teacher can satisfactorily deal. This number varies with different teachers. (ii.) The consideration that the rooms are designed for class teaching as distinguished from individual coaching, and if the class is too small, the stimulus and consequent enthusiasm which is derived from numbers will be absent.

The minimum dimensions of a class determined by this second consideration are unfortunately considerably below those which a due regard to economy must enforce in connexion with the design of public elementary schools. The consideration may itself, therefore, be left out of account, motives of economy pointing to the necessity for designing the majority of the classrooms for the maximum of accommodation consistent with the capacity of the average teacher.

In this connexion the inspector of the Board of Education, when reporting upon a secondary school, has stated that "so long as classes exceed twenty-five or thirty in number, so long will the methods in use continue to be those which are associated with the handling of large and unwieldy classes in public elementary schools, in which the individual is lost in a crowd."

We consider that the time has arrived when the Council should definitely fix forty as the limit of accommodation for a classroom in the senior departments of schools to be erected by the Council in future, this being the maximum number of children who, in our opinion, ought to be taught at one time by any teacher of average capacity. This is the number to which both the late authority and the Council have endeavoured to work for some years past, and each recent school has been built to contain two or more forty rooms in a department.

In a two or three-story school the corresponding classrooms in the infants' department will provide accommodation, as a rule, for forty-eight children, but in a school in which the departments are built in separate blocks there will be no such necessary relation between the accommodation of the classrooms in the infants' departments and those in the senior school.

In considering the matter from an architectural point of view, we have received valuable assistance from the architect (Education), who has given us the result of his long experience—extending over a period of thirty-four years—in designing public elementary schools in the county under the late authority, and has also furnished us with a report showing the changes which have taken place from time to time in the method of planning school accommodation. He has also submitted to us sketch plans and estimates for the types and sizes of buildings which are most likely to be required in future. These plans will be laid upon the table for the inspection of members.

Scheme "C" represents a school to provide accommodation for 840 children, viz., 270 boys, 270 girls, and 300 infants. In each of the senior departments there are five classrooms each to accommodate forty children, and two classrooms each to accommodate thirty-five.

Scheme "D" shows a school affording accommodation for 968 children, viz., 310 boys, 310 girls, and 348 infants, and each of the senior departments consists of six rooms each to accommodate forty, and two rooms each to accommodate thirty-five.

Scheme "E" represents a school to accommodate 1,224 children, viz., 390 boys, 390 girls, and 444 infants, and contains in each of the senior departments eight rooms each to accommodate forty, and two rooms each to accommodate thirty-five.

The rooms in the infants' department of each of the above-mentioned types of schools will, in the event of brick division walls being provided, afford accommodation as follows—in the rooms corresponding to the rooms for forty in the senior departments, forty-eight children each, and in the remaining rooms, which will be available for babies, thirty children each.

As regards schools of the three-story type, the size of the rooms in the infants' department on the ground floor is determined by that of the rooms on the floor above, and the accommodation works out at about 9 sq. ft. a place by reason of the fact that smaller desks are used, and consequently an additional row can be placed. In our opinion, however, this method of calculating the accommodation of such classrooms is unsound in principle. The only true basis of the accommodation of a classroom appears to us to be the number of children who can properly be seated, sufficient allowance being made for teachers' desk, blackboards, etc., and if 10 ft. super. is a proper allowance in the senior departments of public elementary schools, we do not think that less space should be provided in the infants' departments. Indeed, but for the heavy additional expenditure which would be involved, we would have recommended the Council to adopt the same basis of calculation in all departments.

We have referred more particularly to three-story buildings, as this is the type of school which has been erected in the majority of instances in the past, but it should be pointed out that, as the need for new schools in the future is likely to be greater in the suburbs than in the more densely populated parts of the county, it will probably be found possible to secure larger sites, thus more frequently enabling separate buildings of one or two stories to be erected. The majority of schools built during the last four or five years, however, consist of one or two stories, and the Board of Education have expressed their preference for this type of school to the type consisting of three stories.

In connexion with the general question, we have been considering the possibility of providing partitions instead of permanent structural brick division walls between the classrooms, in case it should be thought desirable at any future time either to alter the shape or reduce the size of the classrooms: such an arrangement could be carried out without incurring much expense, and we have approved a plan showing how it would be possible to obtain such elasticity in working.

The subjoined statement shows the estimated cost of erecting on suitable sites three-story schools with accommodation as follows:—(i.) School for 840 places, estimated cost, main building only, 8,824*l.*; estimated cost a place, main building only, 10*l.* 10*s.* 1*d.* (ii.) School for 968 places, estimated cost, main building only, 13,120*l.*; estimated cost a place, main building only, 13*l.* 11*s.* (iii.) School for 1,224 places, estimated cost, main building only, 15,128*l.*; estimated cost a place, main building only, 12*l.* 7*s.* 2*d.*

The difference in cost between (i.), (ii.), and (iii.) is caused by the provision of two staircases in (i.) and four in (ii.) and (iii.), necessitated by the requirements of the Board of Education.

We think it right to point out that the proposed rearrangement of structure will, in the case of most of the new schools, involve an addition to the staff of the school, consequent upon the lesser numbers of children which will be taught in one room. We cannot give any exact estimate, as the number must depend upon the plan finally adopted in each school. Any additional expenditure in respect of staff thus incurred will be, nevertheless, more than compensated for by the better teaching which will be given to the children, by reason of a lesser number being taught in the separate class. We recommend that, as a general rule, in public elementary schools to be erected in future no classroom in the senior departments be planned to accommodate more than forty scholars, and no classroom in the infants' department for more than forty-eight, except in particular cases in which, in the opinion of the Education Commitee, there are circumstances which render any modification in the design or character of the building desirable."

Fifty Years Ago.

FROM THE *Builder* OF DECEMBER 20, 1856.

THE CHELSEA EMBANKMENT.

A DEPUTATION from the vestry of Chelsea, consisting of Mr. Tite, M.P., Mr. Fielder (churchwarden), Mr. Perry, Mr. Slade, Q.C., Mr. Foy, and Mr. Hall, attended by Mr. C. Lahee, vestry-clerk, waited on Sir Benjamin Hall at the office of the Board of Works, Whitehall-place, on Thursday, December 11, on the subject of the Chelsea embankment.

Mr. Tite, having introduced the deputation, said—The embankment, as originally proposed, was to have extended from Vauxhall Bridge to Battersea Bridge, and to complete the work a sum of 143,000*l.* was voted by Parliament. It so happened, however, that in executing one-half of it the money was nearly all expended, and when the deputation urged upon Sir Benjamin the absolute necessity of completing it, he had said there was no compulsory power vested in the Board, but that he would ascertain if any money were left of the sum which had been voted for the purpose. We produced on that occasion also pledge after pledge given by former commissioners that the work should be completed.

Sir Benjamin Hall said, in reply, he had been over the whole of the works, beginning at Vauxhall Bridge, and found that they had been dragging on in a very improper way. He was quite prepared to carry them out as far as the property of the Government went, but had no power to go further: our power, said he, only allows us to negotiate with the parties who possess property along the embankment, and it is permissive with them to agree to or reject the proposals. They had rejected them, and had stated that if the works go on they will resist; indeed, beyond Chelsea Hospital we have been thwarted in every possible way, and our means do not enable us to prevent it. He was anxious to carry out the work, and believed it would be one of the finest things in the metropolis.

Illustrations.

INTERIOR, ST. REMY, DIEPPE.

THIS illustration is reproduced from an oil painting by Mr. A. C. Conrade.

Between the cylindrical columns of main arcade are seen the curious stilted arches of the ambulatory, and the Renaissance reredos. The lighting of the picture is very effectively managed.

DESIGN FOR A TOWN CHURCH.

THIS design was prepared in competition for the 60*l.* Travelling Studentship at the R.A. Schools, in accordance with conditions published to the students early in the year.

A confined irregular site at the corner of two streets was given, with light partially blocked on the north and east sides. A tower, and seats for 900 people, were required to be shown.

The eastern position of the tower was adopted to provide a satisfactory stop to the houses in the street at the south-east of the building, and to screen the difference in the line of the street frontages and the axis of the church. The building-line of the street was kept by the granite base, above which the masses of the church follow the form of the interior.

The whole of the seating required was provided on the ground floor, the plan being arranged so as to avoid piers among the seats. Passage aisles at the sides of the church are practically in the thickness of the walls, which were designed solid to keep out the noise and vibration of the street traffic.

Two organs were proposed in galleries at the sides of the choir, under which is a working basement.

The materials intended to be used were granite for the base, Portland stone facings, and the domes covered with marble slabs.

WILLIAM HARVEY.

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SCHOOL, ACTON.—A new school building, erected in Southfield-road, Acton Green, by the Acton Education Committee, the contract price for which was 22,587*l.*, has just been opened. Designed by Messrs. Monson, architects, the schools provide accommodation for 1,137 scholars, each floor of a three-story building having a large central hall and seven classrooms. The building is lighted throughout by electricity, and there is a cookery centre fitted with all the latest appliances.

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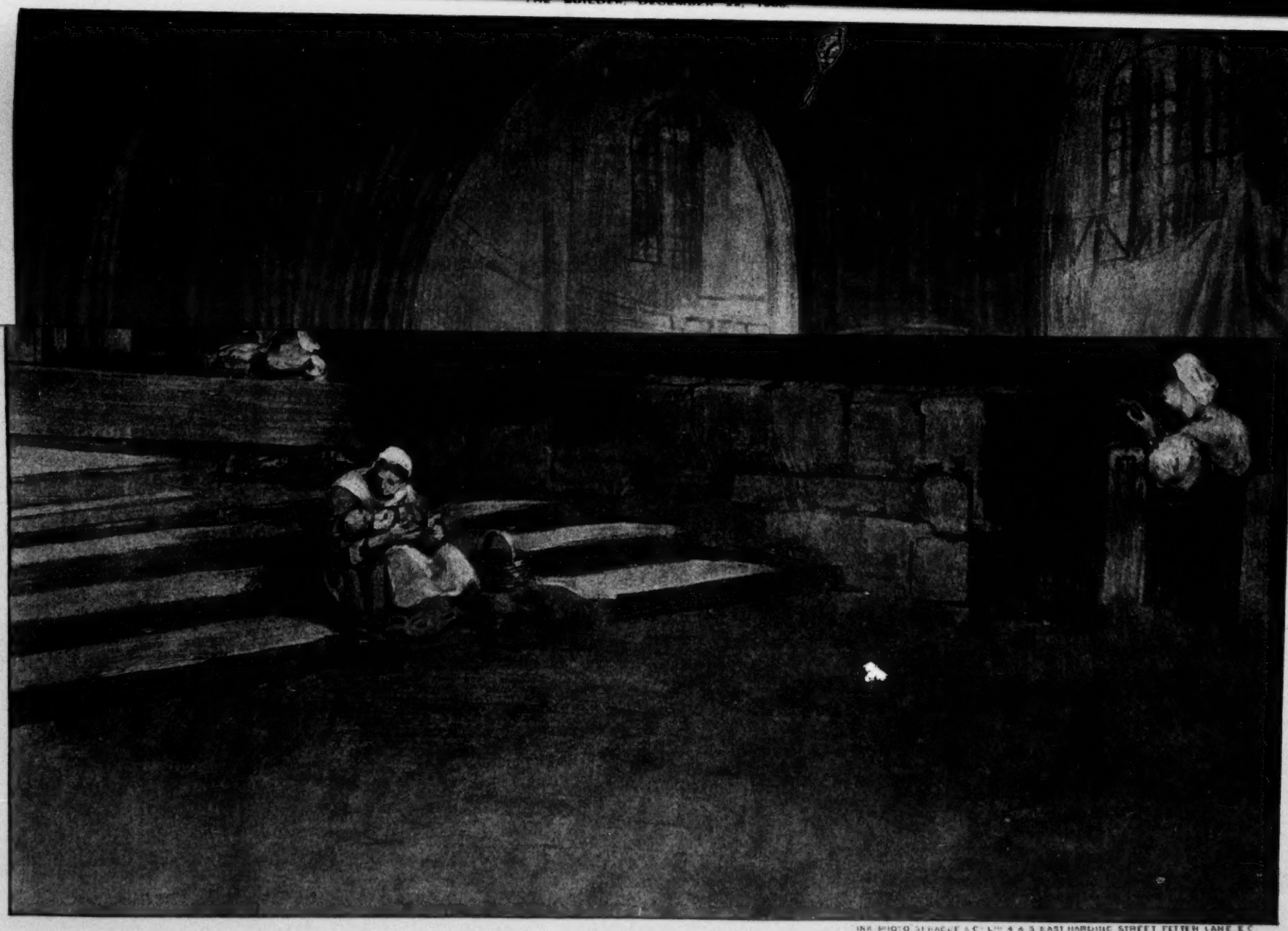

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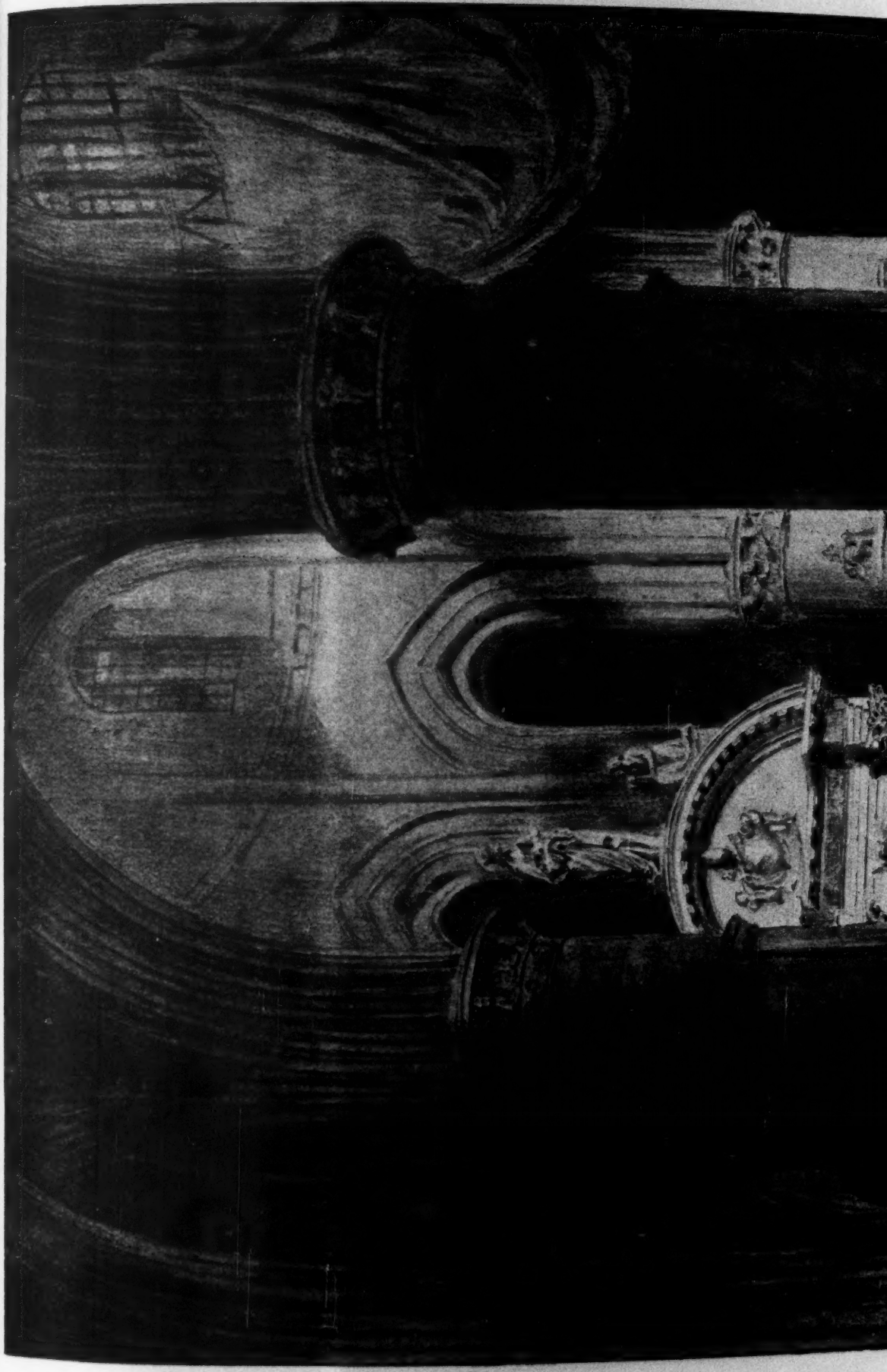

INTERIOR CHURCH OF ST. RÉMY, DIEPPE.

FROM A PAINTING BY MR. A. C. CONRADE.

A TOWN CHVR
AT THE CORNER OF TW
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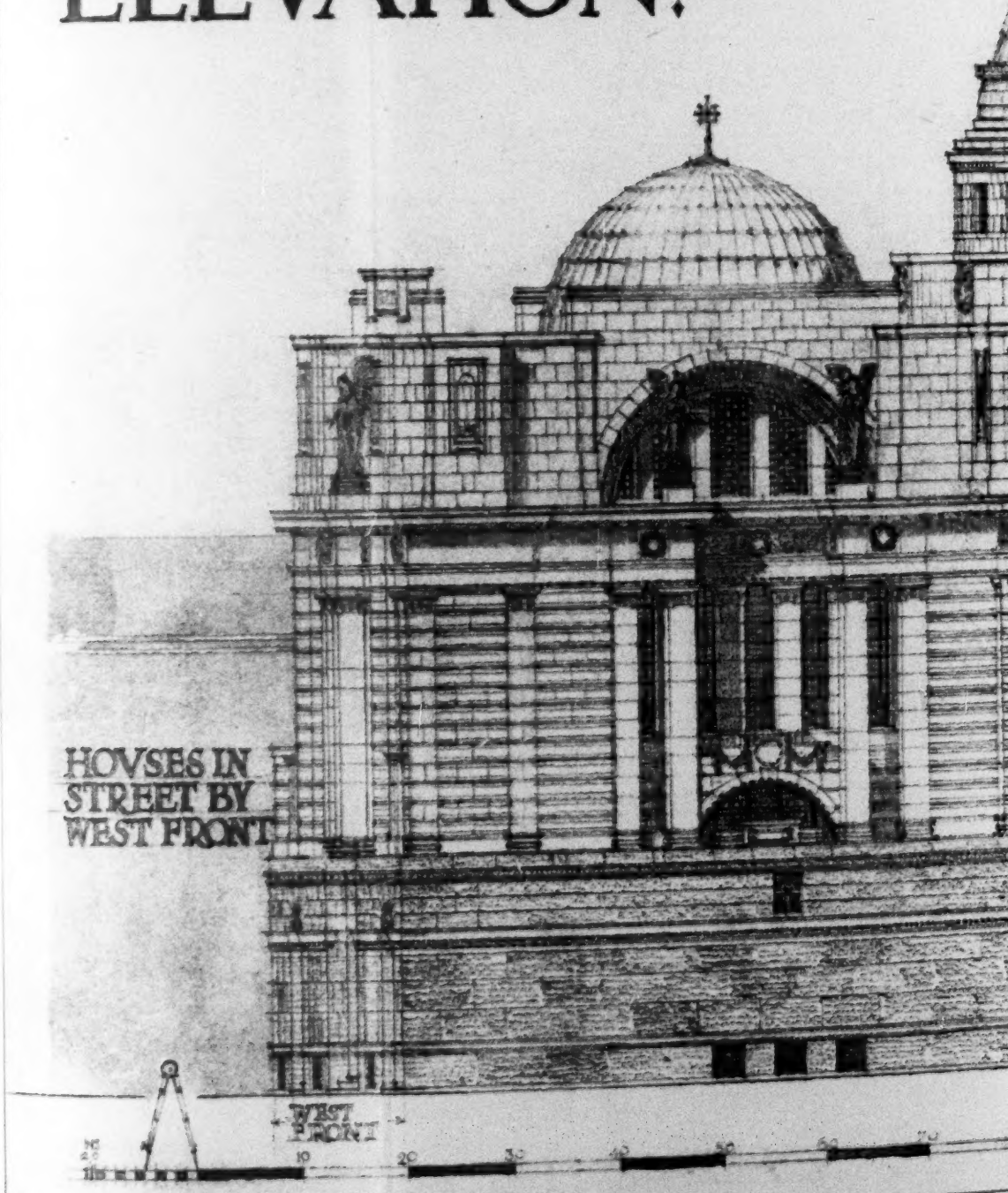

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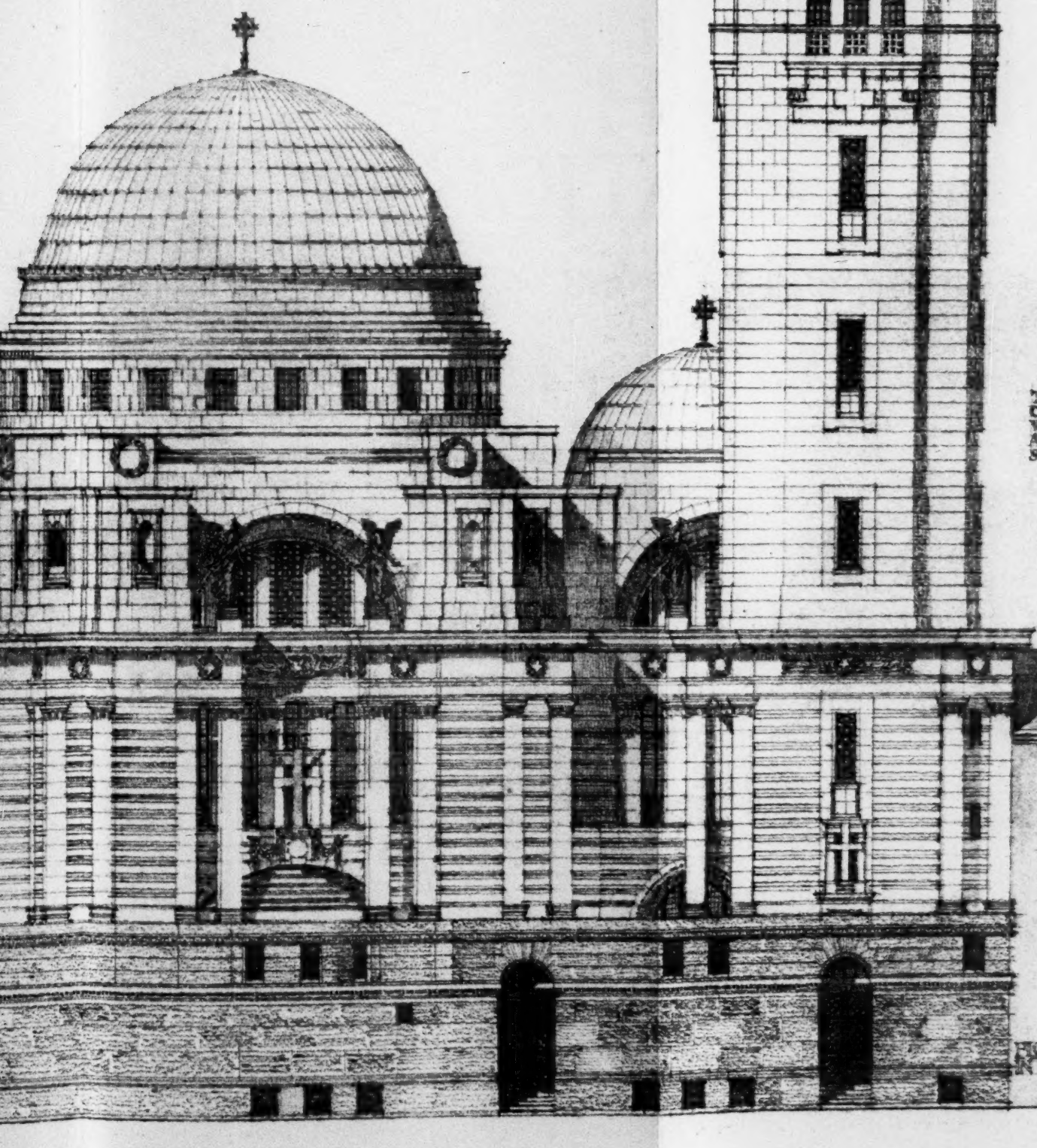
THE TOWER STANDS CLEAR OF THE VPPER WINDOW AND DOME AND HAS ITS FACES SQVARE TO THE STREET.
HOVSES IN STREET ABVT HERE VPON THE TOWER.
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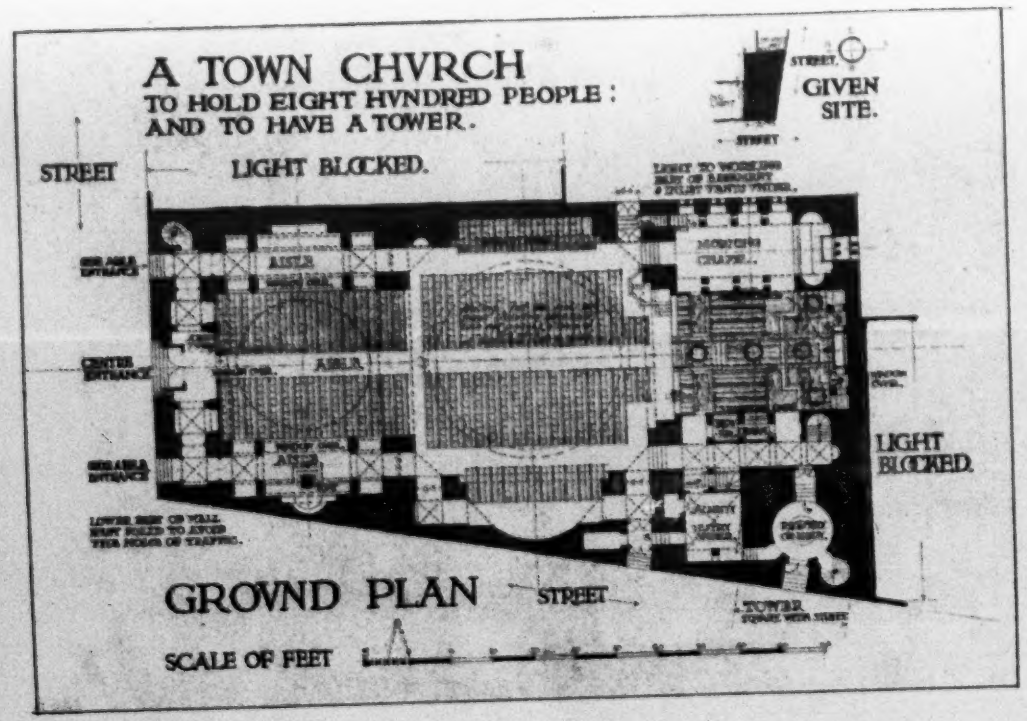
SCALE OF FEET.

ESIGN FOR A TOWN CHURCH.—By Mr. William Harvey.



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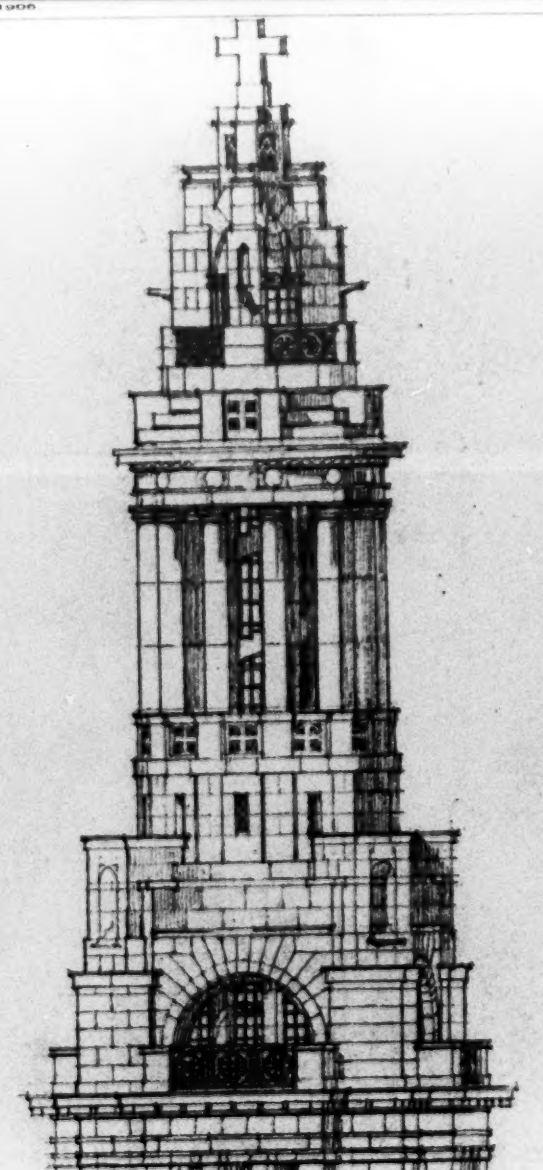

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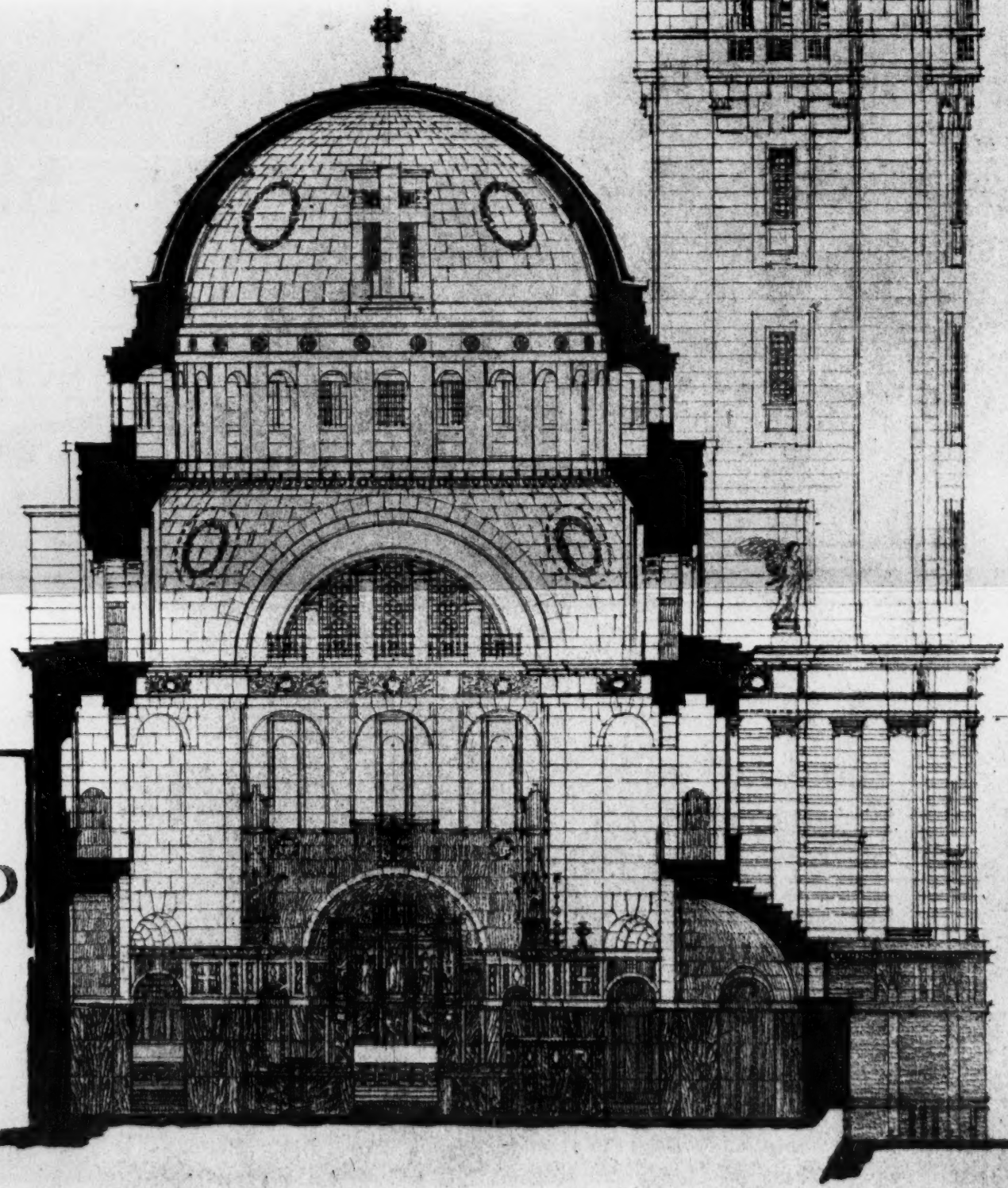
SHEWING EAST END.



LIGHT BLOCKED

HOVSES ABVT ON TOWER WHICH FACES SQVARE TO THE STREET.

SCALE OF FEET

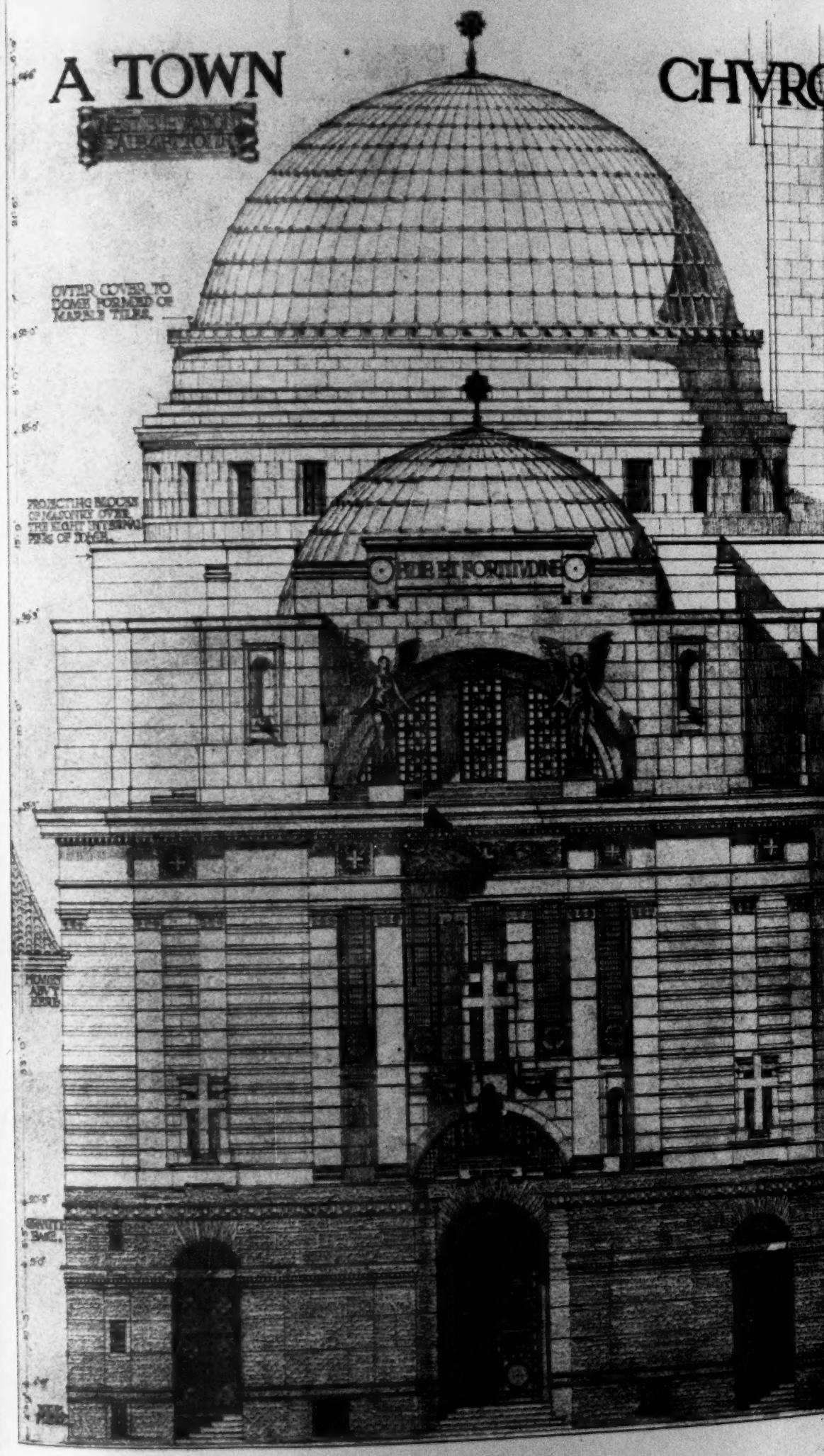
INK PHOTO SHRAGUE & Co LTD 4 & 5 EASTHARDING STREET FETTER LANE E.C.

Royal Academy Travelling Studentship, 1906.

DESIGN FOR A TOWN CHURCH.—By Mr. William Harvey.

SECTION AND PLAN.

A TOWN CHVRC


OUTER COVER TO DOME FORMED OF MARBLE TILES.
PROJECTING BLOCKS OF MASONRY OVER THE EIGHT INTERNAL PIERS OF DOME.
HOMEN ABIT FERE

WEST ELEVATION.

Royal Academy Travelling Studentship, 1906.

DESIGN F

TRCH

A TOWN CHVRCH

EASTERN END OF CHVRCH

SKETCH DETAIL.

INK PHOTO. SPRAGUE & C° LT° 4 & 5 EAST HARDING STREET FETTER LANE E.C.

INTERIOR ELEVATION OF EAST END.

N FOR A TOWN CHURCH.—By Mr. William Harvey.

THE LONDON COUNTY COUNCIL.

THE last meeting of this Council before the Christmas recess was held on Tuesday in the County Hall, Spring-gardens, S.W., Alderman Spicer, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Battersea Borough Council 7,375*l.* for contributions to street improvements; Hammersmith Borough Council 18,985*l.* for electric lighting; Lewisham Borough Council 674*l.* for paving works. Sanction was also given to borrowing the following:—1,637*l.* for paving works by Hampstead Borough Council; 34,384*l.* for electric lighting by St. Marylebone Borough Council; and 7,109*l.* for contribution to street improvement and 9,831*l.* for electric lighting by St. Pancras Borough Council.

Lack of Employment.—The General Purposes Committee recommended, and it was agreed:—

"That it be an instruction to the Committees of the Council, who have furnished particulars of work which might be offered to the Central (Unemployed) Body for London as suitable for the classes of the unemployed qualified for assistance under the Unemployed Workmen Act, 1905 (i.) that the Central Body shall be the employers and responsible for the conditions of the employment as between themselves and the persons employed; (ii.) that the works executed by the Central Body shall be subject to supervision by the proper officers of the Council; and (iii.) that the amount of co-operation in cost on the part of the Council shall be such as is certified by the Council's officers to be the fair value of such work."

Position of Voluntary Schools.—The Education Committee recommended that peremptory notice should be served on the managers of thirty-two voluntary schools in London that the Council would cease to maintain them as from a fixed date, by reason of the unsuitability of the premises.

Mr. Graham Wallas stated that since the last meeting plans had been sent in by the managers in most cases, showing that these gentlemen desired to put their houses in order. On behalf of the Education Committee he was, therefore, willing to make a concession, by which they would be willing to extend the time by one month, and also to give a month's notice of intention to withdraw maintenance.

In that amended form the recommendations were adopted.

Disposal of the Council's Surplus Property.—The Improvements Committee reported as follows, the recommendation being carried after discussion, during which it was contended by some speakers that the Council would not be able to dispose of its land unless better conditions were offered:—

"We have carefully considered for some time past whether any means can be adopted to expedite the letting of the Council's property, and, in connexion with this question, the suggestion has been made that lettings might be facilitated if persons who approached the Council with regard to taking leases of its property were given information as to the rents which the Council would be recommended to accept. It has also been suggested that the prices per foot which the Council would be recommended to accept for the various sites should be fixed at once and that the first offer of the rent which had been so fixed should be accepted.

The Council will remember that our proceedings with regard to the letting of land are governed by paragraph 8 of our order of reference which empowers us, subject to the Council's sanction, to enter into contracts for the sale or lease of land "provided that, unless the Council otherwise direct, all property to be sold or let shall in the first instance be submitted to public auction." In the case of property submitted to auction it is necessary for a reserve to be fixed for each lot. This reserve is fixed by us after consideration of a report by the valuer as to his valuation of each lot. These reserves are in sealed envelopes, which are not opened unless substantial offers be received during the auction. In the case of lettings by private treaty it is our practice to consider such offers as are received together with the valuer's estimates of the value of the sites to which the offers relate. Unless it is clear that the offers are bona fide, no information is given as to the prices which the Council would be recommended to accept. Inquiries are often received from persons who are seeking information only to enable them to hawk the property and thus earn commission or to make a profit by securing for themselves a larger offer than that which the Council would probably accept. It is clearly not to the interest of a public authority like the Council that such proceedings should be encouraged, and we therefore see no reason to depart from the present practice.

With regard to the suggestion that prices should be fixed at once for the various sites belonging to the Council we desire to point out that the more valuable portions of the Council's surplus property are of such a description that it is impossible to fix the true value of the sites until the market has been tested and the extent of the competition ascertained. Even in the case of ordinary property there have been several instances where the rent eventually received has been greatly in excess of that which, having regard to the previous transactions in property in the locality, we should have advised the Council to accept. The only object of fixing the rents would be to fix the minimum with a view to inviting offers. This might have the result of disposing of some of the lands more readily, but the difference between the minimum and the proper rent would accrue as profit to the lessee. We consider that such a course might lead to a state of affairs similar to that revealed at the inquiry into the work of the late Metropolitan Board of Works. It will be sufficient, perhaps, if we quote three instances of the abuses which are likely to occur. In one case a site, leased by the Board for 56*l.* a year, was let very soon afterwards at a rent of 1,090*l.*; in another case property was sold for 1,500*l.*, which was resold within a year for 3,000*l.*; in a third case a site was resold at a profit of nearly 2,000*l.* before the original purchaser had even obtained the land from the Board. Although there were other reasons, we think that these results may be chiefly attributed to the anxiety of the Board to dispose, as soon as possible, of its surplus land. We conceive it to be the wish of the Council that, instead of a large profit being secured by private speculators out of dealings in its surplus land, every effort shall be made to obtain for the public adequate rents for the land belonging to the Council. We recommend that no departure be made from the present practice with regard to the disposal of the Council's surplus land."

Houses Let in Lodgings.—The Report of the Public Health Committee on this subject, printed in our issue for December 8, was carried after a brief discussion.

Tramways.—The Highways Committee recommended:—

"That the estimates of expenditure on capital account, amounting in all to 91,870*l.*, submitted by the Finance Committee, be approved, in respect of the reconstruction, or construction, and equipment for the underground conduit system of electric traction, of the undermentioned tramways, namely—

Tramways.	Estimate Number.	Details of Estimate.		Total.
		Trackwork, etc. (excluding rails).	Cables and Cable Ducts.	
		£	£	£
(1) From Vauxhall *viâ* South Lambeth-road and Stockwell-road to Brixton-road	5595	59,100	3,050	62,150
(2) From Defoe-road *viâ* Tooting High-street to a point opposite Longley-road authorised by the London County Council (Tramways and Improvements) Act, 1901	5596	8,200	1,958	10,158
(3) From Tooting High-street *viâ* Mitcham-road to the county boundary near Tooting-junction railway-station, authorised by the London County Council (Tramways and Improvements) Act, 1906	5597	16,300	3,262	19,562

"That the estimates of expenditure on capital account, amounting in all to 37,390*l.*, submitted by the Finance Committee, be approved in respect of the provision of machinery, plant, etc., at the proposed Loughborough Junction and Tooting sub-stations, namely,

Sub-station.	Estimate No.	Details of Estimate.		Total.
		Machinery, Plant, etc.	Cables, Cable Ducts, etc.	
		£	£	£
Loughborough junction	5598	8,850	9,250	18,100
Tooting	5599	8,850	10,440	19,290

"That the estimate of expenditure on capital account of 6,200*l.*, submitted by the Finance Committee, on account of the provision and laying of cables, cable ducts, etc., required for the reconstruction, for the underground conduit system of electric traction, of the tramways from Vauxhall, *viâ* South Lambeth-road and Stockwell-road to Brixton-road, be approved.

That the contract entered into with Messrs. Reid Brothers, as reported on October 10, 1905, for the laying of cable ducts in connexion with portions of the Council's tramways, be extended so as to include the laying, at a cost not exceeding 6,200*l.*, of the cable ducts. . . ."

Erection of Holloway Car-shed.—The Highways Committee brought up the following report:—

"We have had under consideration the question of the erection of a car-shed to be built at Pemberton-gardens, Holloway. The Council, on December 12, 1905, decided to acquire the interest of the Tufnell and Caledonian Park Syndicate in the property known as the Caledonian Football Ground, for a sum of 20,000*l.*, for the purpose of the erection thereon of this car-shed. The building will be required in connexion with the electric working of the tramways in Holloway-road and City-road, for which estimates were approved on December 4, 1906, and for other portions of the Council's northern tramways to be reconstructed in the near future. The Council on the same date approved an estimate of 255,000*l.* for the provision of 300 additional electric cars for the working of new tramways to be electrified during the year 1907-8, and a large number of these cars will be accommodated in the proposed new car-shed, which, when completed, will house 328 cars. We reported on December 4, 1906, that it was proposed to invite tenders for the erection of the car-shed from certain selected firms upon the basis of a schedule of prices, and the Council decided that quantity surveyors should be employed to measure up the completed work in order to ascertain the precise cost. In order that the building may be ready by the time required, it is desirable that the work should be commenced without delay. With this object, the Council will have before it on December 11, 1906, a report in which we suggest that we should be authorised during the Christmas vacation to open any tenders which may be received. The total cost of the work is estimated at 100,600*l.*, which includes the cost of erection of a foreman's house, the provision of traversers, the rails and trackwork in the car-shed, and certain incidental expenses. We recommend that the estimate of expenditure on capital account of 100,600*l.*, submitted by the Finance Committee, in respect of the erection of the Holloway (Pemberton-gardens) tramways car-shed, including incidental expenses, be approved."

Norbury Estate—Brickmaking.—The Housing of the Working Classes Committee reported that burnt ballast will still be required in the making up of roads and footways and in connexion with building operations on the estate, and it is proposed to manufacture concrete blocks and slabs from burnt ballast and the broken materials left from the brick burning. The concrete blocks will be required for use in the construction of retaining walls, etc., and the concrete slabs will be used for the internal walls of the cottages. The supply of red bricks made or in course of manufacture will only be sufficient for about one-half of the cottages shortly to be erected on section B, and the Committee propose to continue the manufacture of red bricks in small quantities in accordance with the demands of the estate. About 2,942,000 stock bricks and 180,000 red bricks have been made during the season, and an offer has now been received for the purchase of two clamps, together containing about 900,000 bricks, which for present purposes may be regarded as surplus stock. The Committee recommended:—

"That the estimate of expenditure on capital account of 1,200*l.*, submitted by the Finance Committee in respect of the employment of labour and the purchase of materials required in connexion with the burning of ballast, the manufacture of red bricks, and concrete slabs and blocks, and the care of the brick-making machinery and plant on the Norbury estate during the season 1906-7, be approved."

Vauxhall Temporary Bridge.—The Improvements Committee recommended, and it was agreed:—

"(*a*) That the estimate of expenditure on capital account of 5,000*l.*, submitted by the Finance Committee in respect of the demolition of Vauxhall temporary bridge, and of the works incidental thereto, be approved.

(*b*) That expenditure not exceeding 5,000*l.* be sanctioned in respect of the demolition of Vauxhall temporary bridge, and of the works incidental thereto; that the tender of C. Wall, Ltd., to undertake the removal of the bridge, and the execution of certain other works to the satisfaction of the Council and of the Thames Conservancy, and to pay the Council 50*l.*, be accepted."

Land at Shooter's Hill.—The Parks and Open Spaces Committee recommended that the estimate of expenditure on capital account of 4,620*l.* submitted by the Finance Committee in respect of the acquisition of 9 acres of land at Shooter's Hill for the purpose of a public open space, including legal and other expenses, be approved.

The recommendation was carried.

Paving of Roadways Outside Schools.—The Education Committee recommended, and it was agreed:—

"That, to meet the educational requirements, it is essential that the tracks of the tramway lines of the Council opposite to London County Council schools should be laid with wood or other silent paving, and that the Highways Committee be instructed to consider and report upon the whole question."

District Surveyors.—The Building Act Committee reported as follows:—

"We regret to have to report the death, on October 19, 1906, of Mr. Henry William

Stock, District Surveyor for the district of Limehouse, Wapping, St. Katherine, and Ratcliff. Mr. Stock was fifty-five years of age, and was appointed as a district surveyor in 1888.—Mr. William Hewson Lees, District Surveyor for the district of Holborn, East Strand, and part of St. Pancras, and Mr. Daniel Robert Dale, District Surveyor for the district of West Streatham, have resigned their appointments as from December 31, 1906, and March 31, 1907, respectively."

New County Hall—Fees of Assessors in the Competition for Designs.—The Establishments Committee reported as follows:—

"We have considered the question of the remuneration to be made to the assessors appointed to adjudicate on the designs submitted in the competition for designs of the new county hall. It will be remembered that Mr. Norman Shaw, R.A., and Mr. W. E. Riley, F.R.I.B.A., the Council's Architect, will act in both stages of the competition, and that these two gentlemen will be assisted in the final stage by a third assessor, who will only act in that stage. The duties of the assessors will, of course, be heavy, onerous, and very responsible, and, having conferred with Mr. Shaw, we suggest that Mr. Shaw and the assessor to be nominated by the architects competing in the final fixed stage of the competition should receive 1,000 guineas each, but we do not suggest that Mr. Riley should be specially remunerated for his duties as assessor. We recommend:—(*a*) That the estimate of expenditure on capital account of 2,100*l.*, submitted by the Finance Committee in respect of the fees of Mr. Norman Shaw as an assessor, and of the assessor, to be nominated by the competitors in the final stage of the competition, for obtaining designs for the new county hall, be approved; (*b*) that expenditure on capital account not exceeding 2,100*l.* be sanctioned for the payment of a fee of 1,000 guineas each to Mr. Norman Shaw as an assessor on the designs submitted in the competition for designs for the new county hall, and to the assessor, who will be nominated by the competitors in the final stage of such competition."

New County Hall—Conditions of Competition for Designs.—They also reported that:—

"The Council, on July 31, 1906, and December 4, 1906, agreed to the outlines of a competition for securing designs for the new county hall, to be erected on the Westminster Bridge site, and authorised us to take all necessary steps for obtaining the preliminary plans and arranging for the competition on the lines indicated in the report we submitted. The scheme approved for the competition was as follows:—That the competition be divided into two stages: (*a*) the preliminary; (*b*) the final; the preliminary stage to be open to architects of any nationality, and that not less than ten and not more than fifteen of the best designs shall be selected in private by the assessors; the final stage to be open to (1) the authors of the designs selected by the assessors in the preliminary stage, and (2) not exceeding eight leading architects to be invited by the Council, who shall not be required to lodge their designs with the Council until the date fixed for the delivery of the designs in the final stage of the competition.

There will be two assessors for the preliminary stage of the competition, and three for the final, and the question of their fees is dealt with in the preceding paragraph. The Council has already decided that each of the competitors in the final competition shall receive a fee of 200 guineas.

We have had under very careful consideration the question of drawing up the conditions by which the competition will be governed, and in this important matter we have had the advantage of the advice and assistance of Mr. Norman Shaw, R.A., and we have also been in frequent consultation with Mr. W. E. Riley, the Council's Architect. Detailed particulars of the accommodation required by the Council, having regard to the functions of the Council itself, the work of its Committees and of the several Departments, and the intricacies of their detailed workings both in their relations to each other and to the public, have been prepared on the lines indicated in our report of April 18, 1905. . . . There are several points in the conditions to which we attach considerable importance, and to which we wish to direct the special attention of the Council:—(i.) The instructions to competitors indicate that the particulars show the minimum accommodation required by the Council, and that the competitors will have licence to depart therefrom in any details which may be considered necessary for the development of the elevations. (ii.) Following the principle adopted by Government departments in the buildings for the War Office, Admiralty, etc., we propose that the successful competitor in the final stage of the competition shall be assigned the work of carrying out his design. The Council's official Architect will be given discretionary powers in matters relating to internal economy, building construction, and stability of the building, subject to the Council's approval in all matters which, in the opinion of the Council's Architect, should be brought to it for decision. It is intended that the successful architect shall exercise, in conjunction with the Council's Architect, general and usual superintendence of the works during progress, and examine and certify the accounts for the works and payments under the contract. (iii.) We propose that for their services the successful architect and the Council's Architect shall be remunerated on the usual basis of 5 per cent. on the total cost of the completed building other than for work in connexion therewith which will not devolve on the successful architect, and that this commission shall be paid in the usual manner and allocated in the proportion of nine-tenths to the successful architect, and one-tenth to the Council's Architect. (iv.) It is proposed that the sum of 850,000*l.* shall be considered sufficient to provide a substantial structure suitable for the Council's purposes, exclusive of furniture and embankment superstructure, also of any special foundation which may be necessary. (v.) The attention of competitors is drawn to the fact that, in considering the design, the greatest importance will be attached to simple and convenient planning.

On the Council approving the conditions, steps will be taken so that they may be issued as early as practicable in the new year to the architects desiring to compete, and we may mention that a large number of inquiries have already been received in the matter.

We have already reported that suitable dates for receiving the preliminary and final designs will be May 7 and October 3, 1907, respectively, but the latter date will be largely dependent on the number of designs to be assessed. We recommend that the conditions, as submitted with this report, governing the competition for designs for the new county hall, be approved, and that the Establishment Committee be authorised to take the necessary steps in the matter, and to deal with all questions of detail arising in connexion with the competition."

New County Hall—Selection of Eight Architects for the Final Stage of the Competition.—The same Committee also reported:—

"We have had under consideration the question of the selection of the eight architects who shall be invited by the Council to submit designs in the final stage of the competition for designs for the new county hall. After most careful consideration, we recommend that the Council do invite the undermentioned eight architects to submit designs in the final stage of the competition for designs for the new county hall:—Mr. J. Belcher, A.R.A., P.R.I.B.A.; Mr. W. Flockhart, F.R.I.B.A.; Mr. Ernest George, F.R.I.B.A.; Mr. H. T. Hare, F.R.I.B.A.; Mr. T. G. Jackson, R.A.; Mr. E. L. Lutyens, F.R.I.B.A.; Mr. E. W. Mountford, F.R.I.B.A.; and Messrs. Nicholson & Corlette."

The consideration of the three preceding paragraphs was deferred.

Motor Omnibuses.—The Highways Committee recommended:—

"That the Secretary of State for the Home Department be urged to give effect to the recommendation of the Select Committee on Cabs and Omnibuses in the Metropolis as to the desirability of public control over the routes of motor omnibuses, and that, having regard to the heavy wear caused to the public streets by motor and other omnibuses plying for hire, it be also suggested to the Secretary of State that he should consider whether legislation should not be introduced requiring a proper contribution to be made by the owners of these vehicles towards the cost of maintaining the streets."

Heating, etc., Tramway Offices at Paul-street, Finsbury.—It was agreed that the offer of Messrs. Rosser & Russell to arrange for the ventilation of and the provision of heating apparatus at No. 59, Paul-street, Finsbury, for a sum of 194*l.* be accepted.

Provision of Sand-drying Apparatus.—It was also agreed that the offer of Mr. E. Robinson to supply, for a sum of 250*l.*, a rotary and sand drier and motor be accepted.

Webber-row Estate, Southwark.—Completion of Algar and Dauncy-buildings.—The Housing of the Working Classes Committee reported as follows:—

"The third block of dwellings on the Webber-row estate named Algar-buildings is almost finished, and it is anticipated that the fourth block, named Dauncy-buildings, will be completed by the end of December, 1906. Each of these blocks of dwellings contains accommodation for 230 persons in twenty tenements of two rooms, and twenty-five tenements of three rooms, and upon their completion accommodation for 920 persons will have been provided on the estate. The remaining block has been designed to accommodate 210 persons."

Theatres, etc.—The following works have been sanctioned by the Theatres and Music Halls Committee:—

Means of escape from the ballet rooms and other works, Alhambra Palace of Varieties (Mr. W. M. Brutton).

Structural improvements of the Battersea Empire, York-road, Battersea.

Dressing-room accommodation at the Hackney Empire, Mare-street, Hackney.

Arrangements in connexion with (1) the Furniture Trade Exhibition, to be held at the London Exhibitions, Earl's Court; (2) the "Japanese Village" (Mr. A. O. Collard).

Permanent iron barrier at the London Music-Hall, Shoreditch High-street (Messrs. F. J. Eedb & Meyers).

Cinematograph apparatus and stage lighting in the roof of the London Pavilion Music-Hall, Piccadilly Circus (Messrs. Wylson and Long).

Fire curtains at the new theatres in course of erection in Shaftesbury-avenue and Rupert-street and Shaftesbury-avenue and Wardour-street (Mr. W. G. R. Sprague).

Rendering floors fire-resisting, old Swan Hotel, Battersea (Mr. F. J. Fisher).

Helter Skelter Lighthouse, Olympia (Mr. A. O. Collard).

Arrangements in connexion with the exhibition of the Society of Motor Manufacturers, Olympia; model cottage to be erected at the forthcoming Building Trades Exhibition, Olympia; and arrangements in connexion with "Hale's Tours of the World" (Mr. F. H. Payne).

Bottle lift, Oxford Music-Hall, Oxford-street (Messrs. Wylson and Long).

Lavatory accommodation at the Pavilion Theatre, Mile End (Messrs. E. Runtz & Ford).

Arrangements in connexion with the King's room in the basement at the Playhouse, Northumberland-avenue (Blow & Billerey).

Lighting arrangements at the Plumstead Baths (Borough Engineer of Woolwich).

Mission Hall, Acuba-street, Southfields (Mr. J. K. Bateman).

Alterations in the position of certain electric light points and radiators at the Savoy Theatre, Strand (Mr. A. Blomfield Jackson).

List of Rates of Wages and Hours of Labour.—The Works Committee reported as follows:—

"An agreement has been arrived at between the London and District Association of Engineering Employers and the Amalgamated Society of Engineers, whereby employees in the engineering trade are to receive, as from October 27, 1906, an increase in wages at the rate of 1s. a week, or ½d. an hour. The Council's list of rates of wages and hours of labour requires amendment to give effect to this agreement, and we recommend that the Council's list of wages and hours of labour be amended, as from and including October 27, 1906, in order to provide that the rate of wages payable to the undermentioned trades shall be as follows:—

	Rate of pay.
Brass finishers, turners, fitters and erectors, millwrights, smiths, borers, slotters, and planers per hour	9d. to 9½d.
Pattern makers per hour	9½d.

Having transacted other business, the Council adjourned.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Battersea.—A one-story addition to the Battersea Polytechnic, on the southern side of Lurline-gardens, Battersea (Mr. J. Harwood for the Governing Body of the Battersea Polytechnic).—Consent.

Bermondsey.†—A vestry addition in front of the church of St. Augustine, on the south side of Lynton-road, Bermondsey (Messrs. Hesketh & Stokes for the Rev. A. E. Lait).—Consent.

Deptford.—A one-story addition at the flank of No. 296, Queen's-road, Deptford, to abut upon Erlanger-road (Mr. A. D. Johnson for Mr. M. H. Glover).—Consent.

Deptford.—A public convenience on the eastern side of Amersham-road, New Cross, southward of the "Amersham Arms" public-house (Mr. T. Corfield for Deptford Metropolitan Borough Council).—Consent.

Deptford.—Retention of a one-story addition at the rear of "The Rosemary Branch" public-house, Lewisham High-road, Deptford, abutting upon St. Donatt's-road (Messrs. F. J. Eedle & Meyers for Mr. D. J. Jones).—Consent.

Fulham.—An addition to an office building on the eastern side of Seagrave-road, Fulham, opposite the entrance to Merrington-road (Mr. A. Whitelaw for the London and North Western Railway Company).—Consent.

Hackney, Central.—Retention of a conservatory at the rear of No. 16, Stannard-road, Hackney, abutting upon Ritson-road (Mr. G. Withey).—Consent.

Kensington, South.—Erection of a projecting shelter, in front of the Earl's-court station of the Metropolitan District Railway Company, Earl's-court-road, Kensington (Mr. C. H. King for the Metropolitan District Railway Company).—Consent.

Lewisham.—A one-story addition to No. 107, Ringstead-road, Catford, to abut also upon Laleham-road (Messrs. H. H. Castle & Co.).—Consent.

Lewisham.—An extension of the periods within which the erection of one-story shops on part of the forecourts of Nos. 29 and 31, Beacon-road, Hither-green, Lewisham, was required to be commenced and completed, and permission to use the bay-window of No. 29, Beacon-road, for trade purposes (Mr. H. Kent).—Consent.

Lewisham.—A house on the northern side and two houses on the southern side of Bargery-road and two houses on the northern side of Inchmery-road, Catford, with the flanks of three of such houses abutting on the western side of Penerley-road (Messrs. Norfolk & Prior for Mr. J. Watt).—Consent.

Marylebone, East.—That the application of Messrs. V. Buckland & Garrard, for the Right Hon. the Earl Temple, for an extension of the periods within which the erection of a building on a site between Nos. 11 and 13, Portland-place, St. Marylebone, was required to be commenced and completed, be granted.—Consent.

St. George, Hanover-square.—An oriel window in front of No. 24, Upper Brook-street, St. George, Hanover-square (Mr. R. S. Wornum for Mr. S. E. Kennedy).—Consent.

Strand.†—Retention of four electric arc lamps

and a projecting sign in front of the London Pavilion Music Hall, Piccadilly-circus (Messrs. Wylson & Long for the directors of the London Pavilion, Ltd.).—Consent.

Strand.—The retention of a projecting fascia in front of a shop on the northern side of Shaftesbury-avenue, Strand, between Rupert-street and Wardour-street (Mr. W. G. R. Sprague for Mr. J. Jacobus).—Consent.

Strand.—Erection of two illuminated signs over the public way of Carting-lane, Strand (Messrs. Collcutt & Hamp).—Consent.

Wandsworth.—Porches to seventeen houses on the south-eastern side of Deerhurst-road, Streatham-common north, Wandsworth, southward of Hill House-road (Messrs. Cole & Wooding).—Consent.

Westminster.—The retention of a projecting clock in front of Ruskin-house, Rochester-row, Westminster (Mr. A. Keen for Messrs. W. Morris & Co.).—Consent.

Hammersmith.—Buildings on the site of Nos. 308 and 310, Uxbridge-road, Hammersmith, to abut also upon Arminger-road (Mr. W. F. Hurndall).—Refused.

Paddington, South.—A conservatory addition over the projected porch in front of No. 13, Hyde-park-gardens, Paddington (Mr. J. Gray for Mr. J. K. Greig).—Refused.

Width of Way.

Kensington, South.†—Three houses on the southern side of Kensington-place, Kensington, with a forecourt boundary wall in front of such houses at less than the prescribed distance from the centre of the roadway of the street (Mr. H. F. Rutter for the Metropolitan Water Board).—Consent.

Width of Way and Height of Buildings.

St. Pancras, South.—A building on the south-eastern side of a proposed street to lead from Burton-street to Mabledon-place, St. Pancras, with a portion of the building and forecourt fence at less than the prescribed distance from the centre of the roadway of the said street and with a portion of the building exceeding in height the width of such street (Messrs. Joseph & Smithem for the St. Pancras Metropolitan Borough Council).—Consent.

Lines of Frontage and Height of Building.

Clapham.—The Devas Institute on the north-western side of Thessaly-square, Battersea, to a greater height than the width of Thessaly-square (Mr. H. Howard Batten for the trustees of the London Parochial Charities).—Consent.

Lines of Frontage and Construction.

Hackney, North.—The retention of a wood and iron structure upon part of the forecourt of No. 19, Filey-avenue, Upper Clapton (Mr. G. Kemp).—Consent.

Marylebone, East.—Three "cathead" cranes at the premises of Messrs. Waring & Gillow, Ltd., Castle-street, East Marylebone (Mr. R. F. Atkinson for Messrs. Waring & Gillow, Ltd.).—Consent.

Width of Way and Construction.

Hammersmith.—The construction and retention of an iron shed on the southern side of Downplace, Hammersmith (Mr. A. Dawkins for the London and Westminster Motor Omnibus Company).—Consent.

Space at Rear.

Chelsea.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a building on the south-western side of Draycott-avenue, Chelsea, with a one-story portion on the space at the rear exceeding 10 ft. in height (Messrs. Bourchier, Burmester, & Galsworthy for Miss Cowper Coles).—Consent.

Holborn.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the retention of an addition upon a portion of the space at the rear of No. 18, Handel-street, Bloomsbury (Messrs. Johnson & Co.).—Consent.

Chelsea.—Three dwelling-houses upon a site on the western side of Basil-street, Chelsea, southward of Washington-mansions, with irregular open spaces at the rear (Mr. A. Mitchell for Messrs. Holland & Hannen).—Refused.

Height of Building.

Whitechapel.—A building on the eastern side of Middlesex-street, Whitechapel, to abut also upon the southern side of Strype-street, and to exceed in height the width of Strype-street (Mr. C. B. Hollish for Messrs. C. & H. Finegold).—Consent.

Space at Rear and Height of Building.

St. George, Hanover-square.—The re-erection of No. 3A, Hamilton-mews, St. George, Hanover-square, to a height exceeding the width of Hamilton-mews, and with an irregular open space at the rear (Messrs. W. H. Romaine-Walker & Besant for Mr. B. Lewis).—Consent.

Cubical Extent.

Strand.—A building on the site of Nos. 132 to 135, Long Acre, to exceed 250,000 cubic feet, and to be used for the purposes of a motor carriage works, repair shops, and showrooms (Mr. W. Woodward for Messrs. Slatter & Son and Mr. W. H. Eastgate).—Refused.

Paddington, South.—That an order be issued to Mr. B. Crewe sanctioning the formation or laying out of a new street for foot traffic only, to lead from Woodfield-road to Harrow-road, Paddington, and the erection of a proposed theatre building abutting upon the southern side of Harrow-road and the western side of the said proposed street (for the Paddington Empire, Ltd.).—Consent.

Formation of Streets.

St. Pancras, South.—Extension of the time within which the formation of a new street for carriage traffic to lead from Burton-street to Mabledon-place, Euston-road, St. Pancras, was to have been clearly defined throughout by posts and rails; and a deviation from the plans approved for the formation of the said street, so far as relates to an alteration in the width of the northern portion of the street (Messrs. Joseph & Smithem for the St. Pancras Borough Council).—Consent.

The recommendations marked † are contrary to the views of the local authorities.

Architectural Societies.

NORTHERN ARCHITECTURAL ASSOCIATION.—A meeting of this Association was held at 6, Higham-place, Newcastle, on the 12th inst., when Mr. G. A. T. Middleton delivered a lecture on "Continental, Romanesque, and Gothic Detail." Mr. Middleton, in the course of his lecture, said the development of architectural detail from the period of the Norman Conquest until the time of the Reformation, as it occurred in England, was well known to every English architect, forming part of his necessary education. That there was a similar development upon the Continent was equally well recognised, but, as the Continental forms do not so greatly influence modern English practice, they had not, as a rule, been so closely studied, particularly as to do so required personal contact with the buildings of other countries, such as was only to be properly obtained at considerable expenditure of time and extensive travel, while even then so little had been written upon the subject that it was only slowly that the various phases of change fell into their right places. The English forms were distinct to themselves in many respects, due to an entirely different inspiration from that which influenced Continental work; and properly to consider the latter it was necessary temporarily to wipe out of one's consciousness all preconceived ideas and to start, as it were, afresh, as if their insular work were non-existent. Like the English, however, the early Romanesque of the Continent had a Roman origin, but it was much more closely allied to its original. There seemed to have been two streams of influence which followed the two main trade routes into North-Western Europe; one along the Rhine, passing northwards as far as Cologne, and then spreading out like a fan across North France and Germany, and the other traversing the South of France and gradually spreading northwards through Poitou and Beri to the Ile de France. The former stream was much more nearly allied to the Roman than was the latter. In the doorways of Mainz Cathedral and in many other examples they found the Corinthian capital in an exceedingly pure form, though it was often used to carry an archway arranged in orders or stages, either unmoulded or enriched with mere rolls at the angles and shallow hollows on the main faces, such as were employed in the early Norman period in England. Arches of the same character were found in the South of France, but the detail of the carving was more Byzantine in type than Roman—*i.e.*, cut down by incision below the general surface of the stone rather than with projecting leaves and volutes, and showing a less appreciation of the use of the chisel and more of the drill. In the north-west of France those two types coalesced, forming what was known as Norman, there being superadded another influence, namely, that of the Scandinavian pirates, who ravaged the whole coastline. The result was the production of an architecture whose details were of a mixed character, the classic origin being often difficult to discover beneath the Scandinavian overlap of billet or chevron, representing embroidery stitches, or of grotesque animal sculpture, or of forms suggestive of twisted wire work. Towards the end of the XIIth century, when the whole spirit of architecture changed and Gothic replaced the Norman of England and the Romanesque abroad, they were accustomed to recognise a similar change in the detail, particularly in the matter of mouldings. This was, however, essentially English, and it was at first a surprise to the English student to find that the mouldings of France and of Germany scarcely altered from their Romanesque character until the end of the XIVth century. The deep undercutting of our beautiful Early English period was unknown in France, save in a few instances where the English influence was paramount. It was much the same, too, with the foliage carving, though in a different degree. It was never so profuse either in France or Germany in the earlier periods as with us, nor of so light and delicate a nature, yet in the XIIIth century it was there representative of the foliage of spring, just as it was with us in England. Our fine rising stem, however, was unknown, but was replaced in the capitals by a broad leaf, like that of the hart's tongue fern, not yet completely open, and consequently ending with a cluster instead of a point, while in continuous enrichments a large flowing scroll was commonly employed, evidently based in general scheme upon the Roman model, an entire moulding being often thus enriched in place of the foliage lying in a hollow and having an almost invariable vertical tendency, as with us. In course of time the spirit changed, and the leaves of summer superseded those of spring. This is representative of the XIVth century, but the undercutting is not often carried to excess, or one might almost say is at present non-existent, the work, whether it be in panels or on capitals, being in low relief, though wonderfully true to nature. The gradual change from spring to summer and again from summer to autumn, which occurred equally in England, could scarcely have been premeditated, though it was exceedingly interesting to trace, until in the later work of France they find an extreme elaboration and delicacy of treatment, as if the masons had at last acquired the full living Gothic spirit, revelling in the beauty of natural forms and in delicacy of execution. Undercutting was often carried to excess, and the bare gnarled bough of winter would sometimes appear amidst the decaying leaves and fully-ripened fruit. Further eastwards, in German territory, two types of work were found in this period, one exceedingly powerful and even heavy, while the other was thin and wiry to excess. Contemporaneously with this development of a new spirit came the evolution of true Gothic mouldings, the work of the French Flamboyant period in particular being original, and as richly cut as English work of the XIIIth century, entirely different from the flat and lifeless "perpendicular" mouldings to which ours had degenerated by this time.—In the course of the evening Mr. A. B. Plummer (Honorary Secretary) read out the assessors' award in connexion with the Measured Drawings and Sketches Competitions. Premier honours in the two competitions respectively were secured by Mr. H. M. Spence (Shields) and Mr. William Riddle (Newcastle), Mr. H. L. Hicks (Gosforth) and Mr. T. W. Milburn (Sunderland) occupying the second places.

SHEFFIELD SOCIETY OF ARCHITECTS.—At the monthly meeting of the Sheffield Society of Architects and Surveyors, held on the 13th inst. in the Society's room, Leopold-street, Mr. J. B. Mitchell Withers lectured upon the architectural treatment of brickwork. Mr. W. J. Hale occupied the chair. Mr. Mitchell Withers commenced his lecture by a brief reference to the ancient use of plastic materials and sun-dried bricks, leading up to the introduction of Roman bricks or tiles, which were of a large size, but only about 1 in. thick. Good mortar and the careful bonding of the brickwork was very important. After referring to some of the early brickwork in England, illustrated by slides of Hurstmonceau Castle, Tattershall Castle, Hampton Court, and various other buildings, he proceeded to illustrate the use of brickwork by the Dutch, and how they introduced stone into their work at points where strength was required. The characteristics of these buildings were such as became a northern type, high-pitched roofs and ornamental gables with bold chimneys being seen

both in the domestic buildings and in the towers and public buildings. To show the use of brickwork under entirely different conditions, illustrations were given of many buildings in Italy where brickwork formed the main structure, and terra-cotta, stone, or more frequently marble was used in conjunction with it. Where marble was used as a facing the lecturer pointed out that the idea was to use it in just the opposite way to that in which the stonework was used in Holland, namely, for filling in spaces on which there was no special weight or strain, though in some cases the brickwork had been entirely cased in it. After referring to the types of tower used in Italy, a few slides of modern buildings in which brickwork was employed were shown. A vote of thanks was accorded on the proposition of Mr. H. L. Paterson, seconded by Mr. T. Winder, and supported by Mr. J. R. Wigfull and the Chairman.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of the Edinburgh Architectural Association was held in the Association's rooms, George-street, on the 12th inst., Mr. Hippolyte J. Blanc, R.S.A., the President, in the chair, when Mr. James L. Lawrence (Edinburgh) read a paper on "The Sanitary Considerations of Building," in which he called attention to the importance of sanitary science. Alluding to the purely public health side of architecture, he said that one most insanitary piece of construction brought about by the huge blocks of buildings was the inner court or smaller well. The only good point about it, and even this was doubtful, was that they could open their window at any time in the year without fear of a draught. But instead of pure air they might get a smell of their neighbour's dinner or a concentrated knowledge of the ash-bucket in the court below. This, with practically no sunlight and too often the need of artificia' [illegible] from about November till March, sh[illegible] nake them hope that planning of this nature would not be long perpetuated. He noticed some time ago that a reason put forth for the cause of the domestic servant problem in London and elsewhere was the bad quarters to which servants were relegated, often with an outlook into these wells. Nor did he think that they were much better off elsewhere north of London, when an odd, badly-lit room without a fireplace was found to appear on a plan, and which it was found convenient to designate "box-room." How often was such a room later on made to serve the purpose of housing the unlucky servant. He did not think people nowadays were blessed with quite so many boxes as the architect would sometimes make out from the space he allotted to them. Of course, if a fire could not be arranged for, it might also be difficult to put in what the law demanded, a ventilation flue or one that would really do its work; but, if possible, this should be provided, because, after all, how many people did have fires in their bedrooms except in cases of illness? The kitchen was to a great extent a dwelling-room, and special provision in ventilation should be introduced for the comfort of its inmates.—Mr. Thomas Fairbairn, in moving a vote of thanks to Mr. Lawrence, said the boxroom business was a thing that should not be sanctioned.—The Chairman intimated that the Association had been fortunate in securing three rooms in the Royal Scottish Academy for the exhibition which is to be held by the architectural profession in the summer. He expressed a hope that the members would do all they could to make the exhibition a success. Meantime they were negotiating for the organisation of the exhibition, and a few committees would be appointed.

MANCHESTER SOCIETY OF ARCHITECTS.—The fourth meeting of the students of the Society was held at the Society's Rooms, on Tuesday, the 11th, when Mr. R. W. Orme read a paper on "Gothic Vaulting." He gave a concise historical sketch of the evolution of Gothic architecture, showing how the desire of the old builders to obtain a fireproof roof first led them to use a stone vault, the use of which led to the great Gothic Minsters of mediæval times. The lecturer then dealt with various forms of vaults, commencing with the groined vault of the XIth century, and illustrating each form by diagrams, noting the difficulties of vaulting oblong compartments and also of web construction. The introduction of the pointed arch obviated at once the difficulty of vaulting oblong compartments, having horizontal ridges. The multiplication of the tierceron ribs lead to the "rib and panel" vault, and later to the "Conoid" form of XVth century vaults. In conclusion the lecturer showed how the rib, which was such an important factor in early vault construction, in later vaults lost all its constructional value, and the vault became either all rib, as in Gloucester Cloister, or all panel, as in Henry VII. chapel at Westminster, which, although a marvellous piece of stone cutting, yet, unfortunately, loses the true essence of Gothic vaulting.—In the discussion that followed, some interesting suggestions were put forward; one being the advisability and possibility of treating ferro-concrete ceilings in a somewhat similar manner to Gothic rib construction. The rather illogical method of covering a stone vault with a wooden roof was also noted, and it was considered advisable to let the vault tell its own tale both internally and externally. A vote of thanks was passed to Mr. Orme for his interesting paper, and emphasis was laid on the excellent manner in which he had illustrated his remarks by a series of interesting diagrams.

Archæological Societies.

THE BRITISH ARCHÆOLOGICAL ASSOCIATION.—At the evening meeting held on December 12, Mr. C. H. Compton in the chair, a paper was read by Mr. E. G. Tooker on "Waltham Abbey, its Architecture and History." The paper was illustrated by a series of lime-light views embracing the chief points of the work at Waltham, and also slides of Durham, Lindisfarne, etc. The precise age of the remains of the church of the Holy Cross at Waltham has long been a source of controversy amongst archæologists, for, although mentioned by Lawrence, of Durham, who was born at Waltham, the earliest manuscript which exists is a tract called "De Inventione Sanctæ Crucis nostræ in Monte Acute, et de ductione ejusdem apud Waltham." This tract may be dated during the latter part of the XIIth century, subsequent, at any rate, to the death of Lawrence in 1176. This unknown writer entered the college as a boy, and in 1144 was a canon; in 1177 he was expelled, together with the other canons. We gather also that the foundation to which he belonged was one of a college of secular clergy established by Harold, and that the estate in the days of Canute belonged to one Tovi, who held the office of Staller under that King. It was on the estate of Tovi, in Somerset, that the cross was found, as a shrine for which Waltham was built originally. An interesting early XIIth century mould of stone for casting religious badges or pilgrim signs is figured in the *Journal* of the Association, Vol. XXIX., page 421; it bears presumably a representation of the holy cross discovered by Tovi, with the legend "SIGNVM: SANCTE CRVCIS, DE WALTHAM" surrounding it. After the death of Tovi the estate of Waltham was in possession of his son, Athelstan; but, for whatever cause, during the reign of Edward the Confessor the Crown was in possession, and Waltham was conferred on Harold at some date subsequent to the year 1053. The original establishment of Tovi consisted of two priests, and Harold founded a college of secular canons of the order of St. Benedict, consisting of eleven canons and a dean, and the later foundation of Henry II. was Augustinian. Now, the date of the consecration of Harold's building can be fixed with fair certainty, for, according to "De Inventione," the church was consecrated by Kinsige, or Kinsi, Archbishop of York, who died in December, 1060, and amongst those present was Gisa of Wells, who was only nominated to his bishopric in 1060. Again, the feast of the Inventions of the Holy Cross was May 3, and it seems probable that this feast would be selected for the consecration. The Waltham writer also states that the King, who was present at the ceremony, stayed until after the Octave, and then proceeded to Winchester to keep Pentecost, and, assuming the Octave at May 10, the only year about this period at which the first Sunday after that date was Whit-Sunday was the year 1060. The remains at Waltham consist of the nave, and this is of early Norman work, though it seems impossible that it is as early as Mr. Freeman maintains. Exclusive of the western bay on each side, the nave has three double compartments on each side, the face of the stonework exhibiting the characteristic of fairly fine jointed masonry throughout, and having the arches ornamented with the chevron, and the hood mold with the billet. Four of the large pillars are enriched with sunk spirals and chevrons. The author of the paper then instituted comparisons with Durham, St. John's Chapel in the Tower, St. Albans Abbey, Winchester, Jumieges, Repton, etc., and deduced the approximate date of the building from the jointing of the masonry and the use of the billet moulding. A careful comparison was made between Waltham and Durham, and also Lindisfarne, laying stress on the chevron and spiral incised lines on the columns. The connexion of Waltham with Durham was established by the fact that Walcher, Bishop of Durham, had been granted the estate of Waltham, and it was assumed by the author that the existing work at Waltham was founded upon Cariliph's work at Durham.—The Chairman, in proposing a vote of thanks to Mr. Tooker, said he had taken a great interest in the question of Waltham Abbey, more particularly from the historical point of view.—Mr. J. G. N. Clift, in seconding the vote of thanks, congratulated Mr. Tooker on his paper, and, while not in entire accord with all that had been said by Mr. Tooker, he fully agreed that the work shown in the slides could not be assigned to an earlier date than the first part of the XIIth century. Mr. Clift also pointed out that the question of wide-jointed and fine-jointed masonry upon which Mr. Tooker relied so strongly was open to exceptions, and also pointed out that Mr. Tooker's arbitrary division between the use of the axe and chisel could not be maintained, for it must be a matter of gradual evolution, and no exact date could be assigned to the change which must have spread gradually through the country.—Mr. R. H. Forster remarked upon the number of times the legendary supernatural movement of relics in a given direction had taken place, and also congratulated the author upon a very interesting paper.—Mr. Kershaw made a few remarks, and after a brief reply by Mr. Tooker the meeting terminated.

SOCIETY OF ANTIQUARIES OF SCOTLAND.—The first monthly meeting of this Society for the present session was held on the 12th inst., Dr. D. Christison, Vice-President, in the chair. A preliminary report on the excavation of the Roman military station at Newstead, Melrose, was given by Mr. James Curle, F.S.A.Scot., illustrated by a plan of the buildings made by Mr. Thomas Ross, architect, F.S.A.Scot., and by many lantern views of the objects found. In the second paper Mr. John Bruce, F.S.A.Scot., of Sumburgh, Shetland, described the results of the excavation of a broch there which had extended over five years. Among the objects found were a large stone bowl, two stone chisels, 14 in. and 18 in. in length; a stone saw, 12 in. long; a number of stone whorls, several stone discs, on one of which is cut a design of interconnected spirals; bone implements, pottery, and a crooked-shaped pin of bronze. The third paper was on terra-cotta lamps, by R. Coltman Clephan, F.S.A.Scot., illustrated by the exhibition of his collection of lamps—Greek, Etruscan, Roman, and Early Christian.

DISCOVERY AT WINCHESTER CATHEDRAL.—During the excavations at Winchester Cathedral, in removing some woodwork inside the north wall of Langton's chantry, Mr. Ferrar, supervising the staff of Messrs. Thompson, of Peterborough, the contractors for the work of restoration, observed a point of wood amongst the grouting and flints, and, carefully removing it to see what it was, he found a yard measure made of boxwood in perfect preservation, with the inches, half-inches, and quarter-inches marked, and at the end the figure 36. Tested by the existing yard this old one is slightly shorter—perhaps the wood has shrunk during the long internment in the wall. It is difficult to give the age of the yard. Bishop Langton's chantry was finished before his death (1500), and most presumably the craftsman forgot his rule, which became buried by the workmen accidentally.—*Southern Daily Echo.*

Competition.

BANGOR UNIVERSITY COLLEGE.—The award in the Bangor University College competition was made known on the 19th inst. The competition was a limited one, and the plans and designs submitted by Mr. H. T. Hare, of London, have been selected.

BOOKS RECEIVED.

INTERNATIONAL PRICING TABLES AND PERCENTAGE REGISTER. B. Gordon Sims and J. Gall Inglis (Gall & Inglis).

MEMORIALS OF OLD SHROPSHIRE. Edited by Thomas Anden, F.S.A. (Bemrose & Sons. 15s.)

THE LAW OF BUILDING, ENGINEERING, AND SHIPBUILDING CONTRACTS. By Alfred A. Hudson, Barrister-at-Law. Third Edition, Vol. II. (Sweet & Maxwell. 2*l.* 12s. 6d. the entire work.)

CONSERVANCY OR DRY SANITATION *versus* WATER CARRIAGE. By J. Donkin, F.R.I.B.A. (E. & F. N. Spon. 1s.)

Correspondence.

ZODIACS IN GERMAN CHURCHES.

SIR,—The zodiacs in German churches are, of course, Gothic in design and execution, in contrast to the Classical zodiacs of Italy, and equal or surpass in interest those of France, though the following are all I know of :—

Outside.—1. *Doorway :* Strasbourg Cathedral, right-hand porch of the grand façade, with the month occupations, on twelve stone cubes, supporting statues of the Ten Wise and Foolish Virgins and two other figures (? Christ and Matthew). By Sabina. XIVth century. Large photograph of it by "G. B., 1-5-92," Strasbourg.

Inside.—2. *Pavements :* S. Gereon, Cologne, three signs on each side and six in front of the altar of the crypt (*Archæologia*, xliv.; "Ann. Arch.," xvii.). By Avenarius. XIth century.—Old Gothic church in Severinskloster, Cologne, a fine mosaic in the vestibule in chocolate and white with the signs in circles.—Cologne Cathedral, in front of the Sanctuary rails is a very large and fine circular mosaic, having Sol, four Lunar phases, and the elements personified in the centre, around which are the signs in circles, *circa* 1848.

3. *Walls.*—Cologne Cathedral, in the arcades near the high altar, age of Lincoln Cathedral.—Cologne Cathedral, in fresco, near the high altar, after old examples, by Steinle. XIXth century.

4. *Windows.*—Cologne Cathedral, the first window in the left aisle in stained glass, with Sol, Luna, Iris, Neptune, Ceres, and four elements.

5. *Clocks.*—Strasbourg Cathedral Museum, in the Cathedral architect's house, opposite the cathedral, on twelve round iron plaques, formerly coloured; part of the old cathedral clock; 33 met. diameter. By Habrecht, 1574. Photogravures of these are in a work on the Strasbourg Exposition, 1895, by Schricker, 1896. Painted on a large square board, with the planetary movements, etc.; from the same clock, 1574. Painted on a circular board, with the astronomical calendar, etc., cir. 10 ft. diameter; part of the same clock. Cut out in plate-iron, and painted in old German costume, each about 12 in. high, fastened on a large iron circle about 6 ft. in diameter, inside a larger one; part of the same clock. Painted on an astronomical globe; from the old clock. Painted on the equator of the globe. All in the Cathedral Museum.—Strasbourg Cathedral, south transept, painted brown, with the emblems and month names on a large broad, gilt circle on the large clock.—Strasbourg Cathedral, south transept, on a celestial globe in front of the clock. The clock is engraved in Euting: "Guide to Strassburg." Also on a photographic postcard, Munsteruhr, No. 3502. Also on a coloured postcard, No. 1335.

6. *Roofs.*—S. Martin, Cologne, painted, of a large size, white on a red ground, in the last bay of the nave, with sun, moon, and stars. XIXth century.—Romanesque church in the Quatermarkt, Cologne, at the intersection of four equal aisles, amidst stars in floral circles in a large circle, gold on blue ground. XIXth century.—Frankfort Cathedral, right-hand transept, painted white on a blue ground round an opening, with sun, stars, and a circle of writing. XIXth century.

D. J.

THE ARCHITECTURE OF SICILY.

SIR,—The following extract from Freeman's small history of "Sicily" (the Story of the Nations) bears out the account I gave in the discussion of Mr. Seth Smith's paper last Friday, of the manner in which the Segestans deceived the Athenian envoys—

"The story went that these envoys and the other Athenians who went with them were taken in at Segesta in a strange way. The Segestans took them to see the temple on Eryx and its wealth, where the envoys were deceived by taking silver-gilt vessels for solid gold. Then they got together all the gold and silver plate in their city, and all that they could borrow anywhere else, and asked the Athenians to a series of banquets, at which each man passed off all the plate as his own. So the envoys went back, thinking that Segesta was a very rich city, and taking with them sixty talents as an earnest. This was early in 415 B.C."

I made a slip, which was afterwards corrected, in saying that the envoys were taken to see the vessels in "the very temple" at Segesta, to which a previous speaker had pointed as justifying the theory that the Greeks built the peristyle of their temples before they built the naos. The point I was endeavouring to make was that these men of Segesta, who could bring themselves to give showy banquets with fraudulent intent, might also, in their solicitude to impress the foreigner, have built their temple on the same principle, viz., outside first and inside when convenient, which, in this instance, happened to be, never.

A. MARYON WATSON.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—XXII.

21. *The Complete Design of a Timber Truss (continued).*

IN this article we take up the detail design of the joints between the principal rafters, the diagonal braces, the vertical ties, and the tie-beam. The positions of these connexions are indicated in Fig. 154, p. 513, and the stresses in the various members will be found in Table XXXVIII., p. 514.

(*m*) *Rafter and Bracing Joints.*—Commencing with the joint P_1 next to the junction of the principal rafter with the tie-beam, we find by reference to Table XXXVIII. that the compressive stress in the inclined brace is 9,100 lb. The dimensions of the same member have already been calculated at 4 in. by 6 in. on p. 575.

Fig. 166 illustrated the usual method of notching the strut into the rafter, and it will be found by resolving the thrust of 9,100 lb. into two components normal to the two surfaces at the end of the strut that a 1½-in. notch will be ample to provide for the component in the direction of the rafter.

Similarly calculated the other component will be found to be well within the resistance of the timber, the bearing surface required being considerably less than that provided by the joint.

Although by Fig. 154 and Table XXXVIII. there is no stress in the tie $P_1 L_1$, it is desirable that the rod should be of such diameter as to afford a reasonable amount of support for the tie-beam at the point L_1. By using a ¾-in. diameter rod the resistance to tension, as calculated on p. 605, will be 4,860 lb.

If this stress were a regular part of the duty to be performed by the tie, we should have to consider the advisability of applying a bearing-plate beneath the nut or bolt-head. In the present case, however, it is sufficient to let the nut or bolt-head into the rafter as shown, but a perferable course is to apply an angle washer, as shown in Fig. 167.

One point to which special attention should be directed is that the centre lines of the brace and the tie ought to intersect at the centre line of the rafter.

A neater and in every way a preferable form of connexion is that illustrated in Fig. 167, where a cast-iron saddle is fitted to the under side of the rafter, being so shaped as to provide a square end bearing for the strut, and to furnish means of securing the strut in position.

Joint P_2 is not quite the same as P_1, for the axis of the inclined brace is almost normal to the axis of the rafter.

By Table XXXVIII. the compression stress in the strut $P_2 L_2$ is 12,700 lb., and, as the dimensions of the member were determined on p. 575 at 4 in. by 8 in., the bearing surface is 32 sq. in.

Taking the permissible compression against the grain of the rafter at 350 lb. (table in *par* (*a*), p. 513), we have for the requisite area :

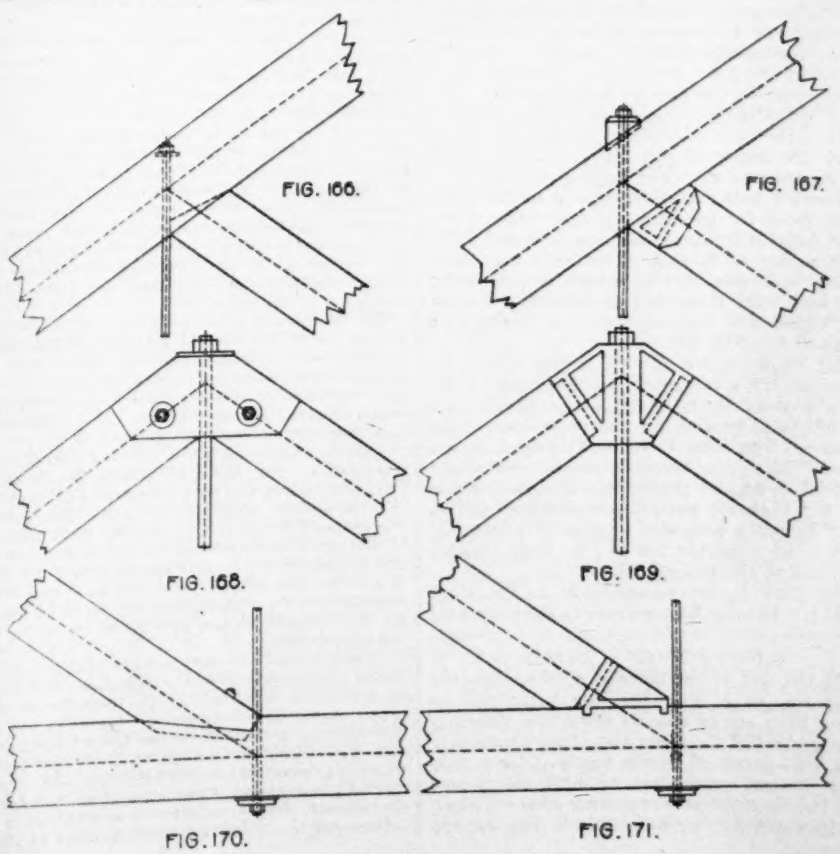
$$12{,}700 \div 350 = 36{\cdot}3 \text{ sq. in.}$$

This is not provided by the dimensions settled, and the strut should be made either 5 in. by 8 in., or 6 in. by 7 in.

An alternative method would be to notch into the rafter a bearing-plate with the dimensions of 6 in. by 7 in. But a plain bearing-plate does not afford convenient facility for fixing the end of the strut to the rafter, and for this reason a preferable arrangement is a cast-iron saddle, similar to that in Fig. 167, comprising a bearing-plate and two side-plates through which a pin can be inserted.

Referring to Table XXXVIII. we find the tension in the vertical tie is 5,000 lb., which as calculated on p. 606, requires a rod of ⅞ in. diameter.

The strain of 5,000 lb. involves a component normal to the fibres of the rafter equal to 5,000 $\cos\theta$ = 4,160 lb., and to keep the stresses on the timber within the permissible limit of 350 lb. per square inch we



ought to fit a washer or bearing-plate with the dimensions of at least

$$4{,}160 \div 350 = 11{\cdot}9, \text{ say, } 12 \text{ sq. in.}$$

If an ordinary-sized bevelled washer were fitted, having the area of about 10 sq. in., the compression would be $4{,}160 \div 10 = 416$ lb. per square inch. The use of a larger washer costs so little that the prudent designer will prefer to use it, and so save any risk of crushing the wood.

Joint P_3 is the connexion between the two principal rafters and the king tie $P_3\ L_3$. As shown in Table XXXVIII. the compressive stress in the portion $P_3\ P_3$ of the rafter is 20,700 lb., and the dimensions of the member being 6 in. by 8 in., the cross sectional area is 48 sq. in. By *par.* (*a*), p. 513, the permissible end bearing stress is 1,600 lb. per square inch, and, so far as resistance to crushing is concerned, the area of the rafter end need not be greater than

$$20{,}700 \div 1{,}600 = 13 \text{ sq. in.}$$

Consequently, the actual area of the rafter is so great compared with the area necessary for the end bearing that it is not necessary to calculate the effect of the slight reduction involved by ordinary methods of jointing.

In the present roof, with a steel tie in place of a timber king-post, the joint now under consideration must be somewhat different from the joint illustrated in Fig. 132, p. 402, and, as we shall see later, the method of fixing the ridge-plate has also to be modified.

Fig. 168 shows a simple form of mitre joint for the right-hand and left-hand rafters of the truss, the members being held in position by two steel plates secured by two ¾-in. bolts. To afford bearing for the king-tie a steel plate extends above the side plates along the surface provided by trimming off the angle formed by the upper sides of the two rafters.

On p. 606 we found that the vertical tie $P_3\ L_3$ might be formed of a 1¼-in. diameter rod upset at the ends, so as to give the requisite area of metal at the bottom of the screw threads, or of a 1¾-in. diameter rod, the latter being there indicated as the more desirable for adoption.

To protect the timber against excessive compression beneath the nut at the top of the bolt it will be sufficient to provide a bearing-plate ½ in. thick extending from side to side of the rafters, and having the width of 6 in. corresponding with the width of the flat surface left by trimming off the top corners of the rafters.

Another method of completing joint P_3 would be to fix a cover-plate, 6 in. wide by about 18 in. long, bent so as to fit above the rafters, the king-bolt passing through the centre, and the two ends being secured by bolts through the rafters passing from the outer to the inner surface in a direction perpendicular to the axis of each member.

A third alternative is to fit the end of each rafter into a cast-iron socket similar to that illustrated in Fig. 169, and calculated in accordance with the method described in connexion with the detail design of the cast-iron shoes for the rafter and tie-beam joint (see Articles XX. and XXI., pp. 665 and 697).

A socket of this kind makes a very neat joint, and has the advantage of obviating all bolt-holes through the rafters, the ends of which are joggled into the casting, as indicated in Fig. 169.

(*n*) *Tie-beam and Bracing Joints.*—Joint L_1 requires little comment, for the vertical tie has theoretically no stress to carry, although it will be in tension in case the tie-beam tends to sag. The total force so developed is not at all likely to be such as to necessitate special means of protecting the lower fibres of the tie-beam against compression, and it will be quite sufficient to place a washer of the usual diameter for a ¾-in. bolt beneath the nut at the end of the tie.

In joint L_2 the compression in the strut $P_1 L_2$ is 9,100 lb. This represents the horizontal force of

$$9{,}100 \cos 33° 40' = 7{,}570 \text{ lb.}$$

If the end of the brace is notched into the tie-beam, as in Fig. 170, the latter will be more than amply able to resist the shearing-force of 7,570 lb. along the plane situated at the level governed by the depth of the notch. The vertical component of 9,100 lb. is also far less than the safe resistance of the timber.

Consequently, we have only to inquire into the crushing resistance of the toe of the strut.

Taking the depth of the notch perpendicular to the axis of the strut at 1½ in., and the width of the strut at 4 in., the effective bearing surface is $4 \times 1{\cdot}5 = 6$ sq. in., capable of withstanding the force of

$$1{,}600 \times 6 = 9{,}600 \text{ lb.},$$

or otherwise expressed, the compressive stress on the toe of the strut is

$$9{,}100 \div 6 = 1{,}516 \text{ lb.}$$

or nearly 100 lb. less than the permissible stress assumed in *par.* (*a*), p. 513.

If the strut were made 6 in. by 7 in. the stress would be reduced to about two-thirds the permissible intensity.

To hold the foot of the strut in place, a coach screw, about 8 in. long by ¾ in. diameter, should be inserted, as shown in the drawing.

One thing to be noticed in connexion with the joint described above is that the strut has to carry a non-axial load, and that its capacity is thereby considerably less than would be the case if the joint were designed in such a way as to insure the coincidence of the centre of pressure with the axis of the member.

The neatest way of fixing the brace so as to permit its maximum resistance to be developed in case of need is to apply a cast-iron shoe, as represented in Fig. 171. By providing an opening of suitable size the end of the strut can be reduced just enough to make its outer surfaces flush with those of the shoe, which must be designed so that the centre line of the member shall pass through the centre of the thrust block.

The thickness of metal necessary in the latter, and the dimensions of the ribs projecting downward into the tie-beam can be calculated as in Articles XX. and XXI.

The vertical tie of ¾ in. diameter has to carry the stress of 5,000 lb., and as the compression across the grain of the tie-beam should be limited to 350 lb. per square inch, the washer above the nut of the bolt ought to be $5{,}000 \div 350 = 14{\cdot}35$ sq. in., or about 4¼ in. diameter.

JOINT COMMITTEE ON WATER REGULATIONS.

THE Joint Committee on Water Regulations met at the Guildhall on Monday, December 10, at eleven in forenoon. Among the authorities and companies represented were:—Birkenhead, Bradford, Birmingham, Bury, Hull, Preston, Newcastle, Weardale, South Staffordshire, Stockport, South Hants, and the Metropolitan Water Board.

In the absence of Dr. Robert Crawford, of Glasgow, Chairman of the Committee, Mr. W. D. Carõe, Master of the Worshipful Company of Plumbers, was voted to the chair.

In opening the proceedings he said that if the chairman had been present he would, no doubt, have remarked on the work of the Committee from the point of view of the Public Health administrator and water authority. He himself regarded the matter rather from the point of view of the architect and consumer. From his own experience he found the greatest difficulty in dealing with the large number of varying regulations, and the Council of the Royal Institute of British Architects would warmly welcome the codifying of water regulations and the setting up of such standards for fittings as would represent, at any rate, an irreducible minimum of efficiency.

Mr. E. Antony Lees (Birmingham) presented the report of the General Purposes Committee, together with a draft annotated model code of regulations with schedules attached setting out the specifications of water fittings, etc., compiled from reports of the various sub-committees, and prepared in form for publication.

On the motion of Mr. J. Watson (Bradford), seconded by Mr. Bancroft (Hull), the General Purposes Committee were empowered to conduct the necessary negotiations with the Local Government Board with a view to the inclusion of the draft code framed by the Committee in the model series of regulations issued by the Board for the purpose of Local Acts and Provisional Orders, enabling regulations to be made on the subject of the prevention of waste or contamination.

It was pointed out that, in view of the authoritative character of the conclusions embodied in the code, representing the majority of the larger water undertakings and three-fourths of the consumers of water in the United Kingdom, and also the practical opinion of architects, plumbers, manufacturers of fittings, and others specially conversant with the subject, the Local Government Board might confidently give a wider and more definite interpretation of their present powers, and thus secure greater uniformity of practice in regard to water regulations to the great advantage of all concerned.

Mr. Fitzroy Doll and Mr. W. D. Carõe were added as members of the General Purposes Committee.

It was reported that the Admiralty had adopted, for use in H.M. Naval establishments, the standard specifications for water fittings framed by the Joint Committee.

The report of the Standardisation Committee was adopted, fixing the meetings of that Committee for the last Saturday in January, April, July, and October, to deal with new fittings and apparatus offered for standardisation and tested in London or at Belfast, Birmingham, Bradford, Glasgow, Newcastle, and Plymouth.

Communications were reported from a number of water authorities and others pressing for copies of the model code.

The Committee decided that the publication of the code should be deferred for a short time pending the negotiations now in progress with the Local Government Board.

COURT OF COMMON COUNCIL.

A MEETING of the Corporation was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

St. Paul's Cathedral.—The Lord Mayor read a letter from Mr. Somers Clarke, stating that there had recently been no serious subsidence of the wall on the south side of the cathedral, and that consent had been given for the construction of a sewer under St. Paul's-churchyard under certain specified conditions.

Lavatory Improvements.—The Streets Committee submitted for acceptance tenders of Messrs. Patman & Fotheringham, Ltd., for providing additional lavatory basins, etc., and accommodation for women at the underground convenience in Aldgate High-street for the sum of 873*l.*, and for similar work at the underground convenience in Bishopsgate-street Without for the sum of 923*l.* The Court approved.

Paving Works.—The following recommendations of the same committee were agreed to:—That the carriageways of the undermentioned streets be taken up and relaid with the existing granite cubes in cement upon a concrete foundation, the deficiency to be made good with new granite, at an estimated cost of 1,935*l.*—Bread-street-hill (part), Lower Thames-street (eastern portion, Monument-street (south side, from the Monument to Fish Market), Fish-street-hill (Monument to Lower Thames-street), Idol-lane, Laurence Pountney-lane, Cock-lane, Pemberton-row; that the carriageways of the following be laid with asphalte, at an estimated cost of 925*l.*—Tenter-street, Roman Bath-street, West Harding-street, Cloth Fair (portion); that the footways of the following be laid with asphalte at an estimated cost of 1,295*l.*—Barbican (north side), Milk-street, Old Change, Fetter-lane; that the footways of the following be relaid partly with new and partly with existing York stone, at an estimated cost of 110*l.*—West Harding-street, Pemberton-row; that the carriageway of Cripplegate-buildings be relaid with asphalte, at an estimated cost of 280*l.*; that the further portion of the carriageways and footways of West Smithfield (in continuation of Long-lane), between the Avenue West of Central-avenue and Farringdon-street, be repaved, and that Charterhouse-street be further repaired as may be necessary during the ensuing year, at a total estimated cost of 700*l.*; A tender of the Val de Travers Asphalte Paving Company, Ltd., for maintaining the carriageway of Mansell-street for another year from January, 1907, at 2s. 6d. per yard super., was also submitted by the committee and approved by the Court.

Street Improvements.—The Improvements and Finance Committee reporting on a reference relative to the improvement of Cloth Fair, submitted for adoption (1) an arrangement for acquiring the ground needed for widening the public way in front of the premises No. 4, Cloth Fair, for the sum of 775*l.*, to include all interests; (2) an arrangement for acquiring the ground needed to widen the public way in front of Nos. 58 and 59, West Smithfield, and No. 3, Cloth Fair, for the sum of 4,769*l.* 7*s.* 3*d.*, to include all interests. Reporting on another reference relative to the improvement of Little Britain, the committee submitted an arrrangement for acquiring the freehold interest in the ground required to widen the public way in front of the premises No. 34, Little Britain, for the sum of 1,220*l.*—The Court approved.

Dwellings for Married Constables.—The Court adopted a report of the Police Committee on the reference as to the erection of dwellings for married constables, recommending the acceptance of the tender of Messrs. Killby & Gayford, amounting to 16,723*l.*, for the execution of the work; that the surveyor be authorised to employ a clerk of the works at a cost not exceeding 175*l.*

Drainage Works.—The Billingsgate and Leadenhall Markets Committee recommended that a tender of Messrs. Sheffield Brothers, of Dalston, at 4,895*l.*, be accepted to execute drainage and sanitary works at the Leadenhall Market.—The Court agreed.

General Building News.

NEW CHURCH, OXFORD.—The foundation-stone of the new church of St. Andrew, which is to be built at the junction of Linton-road with Northmoor-road, north Oxford, was laid a short time ago. The plans for the building were prepared by Mr. A. R. G. Fenning, architect. It is proposed now to proceed with the erection of the first section of the church, comprising the nave, chancel, south aisle, west gallery (for organ and choir), south and west porches, vestry, and heating-chamber. This will provide accommodation for about 560 sittings, and will cost about 7,660*l*. The entire scheme will, it is estimated, cost 10,294*l*.

CHURCH RENOVATION, CLARE.—After being closed for over three months for renovation, the Clare Congregational Church has been re-opened. The renovation has been carried out under the direction of Messrs. Eade & Johns, architects, of Ipswich; the contractors having been Messrs. E. Cowle & H. Mitson.

CHURCH RESTORATION, NORTON, WORCESTERSHIRE.—The restoration of Norton Church has now been completed. The work has been carried out under the direction and from the plans of Mr. C. Ford Whitcombe. The nave has been taken down to its original level (a depth of about 10 in.); the whole of the floor has been laid with concrete 5 in. deep, the passages laid with the old stone tiles, and the floor beneath the seats with kiln-dried oak blocks. The font has been removed westward about 6 ft., to its proper position near the tower-arch, and new oak seats are provided throughout. The walls have been treated with mediæval plaster, after the removal of a thick plaster, varying from 2 in. to 4½ in., which hid many old features of the church. A vestry has been built over a new heating-chamber, in keeping with the work of the old building. Mr. G. Huxley was the builder.

SUNDAY SCHOOL, WALKER.—The Primitive Methodists at Walker have opened a new Sunday-school, the first portion of a scheme which also includes the erection of a chapel. The cost of the work just carried out will amount to about 1,850*l*. The buildings stand on a site in Welbeck-road, and comprise a large hall and kitchen. The builder is Mr. Thomas Hutchinson, and the architects are Messrs. Davidson & Phillipson, Newcastle-on-Tyne.

SCHOOL, DONCASTER.—Alderman H. H. Birkenshaw, Chairman of the Doncaster Borough Education Committee, opened, on the 18th inst., the new elementary boys' school in Chequers-road, Doncaster, which has been erected by the Council at a cost of 7,000*l*. The whole scheme includes schools for 1,460 scholars—540 boys, 540 girls, and 380 infants, and the estimated cost is 20,000*l*., with which is included land for street improvement, the cost of the site being 4,237*l*. The whole range of the buildings will have a frontage of 390 ft. to Chequers-road the frontage of the site itself being 410 ft. The site of the boys' department embraces 2,900 super. yds., and is at the extreme south-easterly end of the site required for the scheme. The building contract was carried out by Messrs. Mullins & Richardson, the heating contract by Mr. C. Longbottom, and the furnishing by Messrs. Illingworth, Ingham, & Co., of Leeds. The work was carried out from designs by the late Mr. Crabtree, and under the direction of the Borough Surveyor, Mr. F. O. Kirby.

THE KING'S THEATRE, EDINBURGH.—The new King's Theatre, Edinburgh, has just been opened. The new theatre is built on the cantilever principle, and in all the three tiers there is not a single pillar. The building has a frontage of 84 ft. towards Leven-street. The chief feature is the principal entrance, which is flanked by shafts having enriched Ionic capitals, surmounted by a central arch, the key block of which carries a balcony supporting an oriel window, two floors in height, and capped with an ornamental stone roof. The windows on the second floor are supported by carved corbels, representing tragedy and comedy. The Tarvit-street elevation is finished in a plainer manner. Ornamental verandas are erected at all the entrances and exits. The main part of the building is entered from Leven-street, and after passing through the veranda two pairs of carved teakwood doors give admittance to the vestibule. The floor is laid with terazzo, and the walls are covered with polished alabaster, while the friezes and ceiling are made of decorated fibrous plaster work. The staircases and balustrades are of white polished marble. Access to the ladies' tea-room and cloakroom, and also to the refreshment bars and smoking-rooms is got from the lounge. The foyer is reached by three separate flights of marble steps, from which entrance to the dress circle is got by three carved mahogany doors, placed in a glass screen. At each end of the foyer is an ornamental kiosk for the sale of fruits, flowers, etc. The width between the side walls of the building is a clear span of 72 ft. On the ground floor are placed the orchestral stalls and pit stalls. At both sides of the stage there are three tiers of boxes—eighteen in all. At each side of the proscenium are figures representing music and art, and the divisions between the boxes are supported by caryatides. The whole of this decorative plaster work is in the French Renaissance style. The roofs are all constructed of steel and concrete, and covered on the top with vulcanite sheeting, while over the top gallery there is placed a large sliding glass cupola. The stage is 65 ft. wide and 55 ft. deep, cut off from the auditorium by a fireproof curtain. The stage flies and roofing are also of steel and concrete. There is a fireproof scene dock. The dressing-rooms are reached from the stage, and they are also fireproof. The building is heated on the hot water, low-pressure system. Messrs. James Davidson, Coatbridge, and J. D. Swanson, Kirkcaldy, were joint architects of the theatre, and Mr. Thomas I. S. Watson, Edinburgh, was surveyor for the contracts. Messrs. W. S. Cruickshanks & Son were the contractors for the whole structure. The cost of the building, exclusive of the site, has been about 50,000*l*.

HOUSING SCHEME, HULME, MANCHESTER.—On the 4th inst., at the Manchester Town Hall, Mr. M. K. North, Local Government Board Inspector, held an inquiry into the application of the Corporation for sanction to borrow 7,500*l*. for the erection of a block of tenement dwellings for the working classes on land in Barrack-street, Hulme. Mr. Hudson, Deputy Town Clerk, explained that the application was supplementary to an inquiry which was held by Mr. Tulloch on October 27, when the inquiry was as to the expediency of enabling the Corporation to acquire the land on which it was now proposed to erect buildings. The result was that the Corporation were authorised to borrow 6,867*l*. for the purchase of the land to be held by the Corporation for purposes of Part 3 of the Housing of the Working Classes Act, 1890. He submitted that after the result of the inquiry the principle was settled, and it was deemed by the Local Government Board as well as by the Council expedient that this land should be acquired, vested in the Corporation, and appropriated for the purpose of the Housing Acts. Mr. Henry Price, the City Architect, produced plans of the tenement dwellings proposed, and explained them. In answer to questions he agreed that sixty-five to seventy cottages could be put on the land. If they were four-roomed and properly built such cottages would cost nearly 200*l*. apiece. On the tenement dwellings, no doubt, the Corporation would make a loss for the future. It would seem that each year there would be a loss of 667*l*. on the proposed buildings. He put the cost at 6¼d. a cubic foot.

NEW THEATRE, CARDIFF.—Messrs. Archibald Dawney & Co. ask us to mention that they carried out the whole of the constructional steel-work in this building, the completion of which was referred to in our last issue (page 699).

PUBLIC HALL, GLEN URQUHART, N.B.—Mr. Bradley Martin has presented a new public hall to the inhabitants of Glen Urquhart. Mr. Mackintosh, architect, of Inverness, prepared the plans for the work.

PARISH ROOM, COWLEY.—A parish room was recently opened at Cowley by the Countess of Essex. It is a brick-built structure, of Cowley stocks and reds, flanked with buttresses on each side, and a cloakroom and kitchen on the left, adjoining the side-entrance. The main hall is 48 ft. by 28 ft., and is capable of seating over 200 people. Mr. W. S. Try was the builder; Mr. F. J. Brewer being the architect.

THEATRE IMPROVEMENTS, BURY ST. EDMUNDS.—Improvements have recently been carried out at the Theatre Royal, Bury St. Edmunds. The work was executed by Messrs. Dean & Co., of Birmingham, the architect being Mr. Bertie Crewe, of London.

MUNICIPAL BUILDING, SOUTHWICK.—A new public hall has been erected at Southwick. The building is of red Southwater brick, and was designed by the surveyor, Mr. George W. Warr. The building contract amounted to 1,490*l*.

FORESTERS' HALL, SHIRLEY.—Members of Court Windsor Castle, of the Ancient Order of Foresters, have built a hall in which to hold meetings. The new building consists of a hall about 51 ft. long by 35 ft. wide, at one end of which is a raised stage 10 ft. wide, with two dressing-rooms attached. The hall is approached by a corridor, at the sides of which are situated the cloakroom and lavatory accommodation. At the back of the hall is a buffet. On the ground floor is also a committee-room, whilst the first floor is retained for ladies' retiring-room, etc. The elevation to Park-street is carried out in red brick, with stone dressings and terra-cotta pediment. The hall is heated by gas radiators, while the illuminant is on the inverted gas mantle system. The new hall was erected by Mr. John Nichol, of Bitterne Park, to plans prepared by Councillor H. J. Weston, of Southampton.

PROPOSED ISOLATION HOSPITAL, HAMPTON.—At the Public Offices, on the 5th inst., Dr. W. W. E. Fletcher, an inspector of the Local Government Board, held an inquiry into the application of the District Council for sanction to a loan of 498*l*. for the erection of a porter's lodge, and a discharging ward at the Isolation Hospital. Mr. S. H. Chambers, Surveyor to the Council, described the plans to the inspector. The lodge would contain on the ground floor a living-room and kitchen combined, with scullery and the usual offices, and on the first floor two bedrooms and a bathroom. The discharge ward would consist of a bathroom, dressing-room, and clothes store, with lavatory accommodation, and the bathroom would be supplied with hot water from the lodge kitchen. The buildings would be constructed with red bricks, with stone dressings. A tender had been accepted for executing the works for 497*l*. 10*s*. from Mr. C. H. Keen, of Cranford, subject to the sanction of the Local Government Board.

PROPOSED BUSINESS EXCHANGE, LEEDS.—It is proposed to establish a new business exchange at Leeds. The proposal is to convert the premises until lately occupied by Messrs. Broadbent, in Briggate, into an Exchange providing postal, telegraphic, telephonic, and messenger services, the first floor being used as a reading-room and room for meetings. The ground floor space is 6,750 ft. The plans have been prepared by Mr. Percy Robinson. A committee has been appointed, and a meeting will be called on January 15 for their report to be considered.

Appointments.

BRADFORD.—The Electricity Committee of the Bradford Corporation have decided to appoint Mr. Thomas Roles to the post of City Electrical Engineer, made vacant by the resignation of Mr. A. S. Blackman, who has secured an appointment at Sunderland.

APPOINTMENT OF SANITARY OFFICERS.—The Local Government Board have sanctioned the appointment of Mrs. A. C. Young and Miss M. Fitzgerald as additional sanitary inspectors of the Metropolitan Boroughs of Islington and Woolwich respectively.

LADY APPOINTED COUNTY SURVEYOR.—Miss Alice Berry, B.E., has been appointed Interim County Surveyor for Galway, in room of her father, who died recently. The total salary is 500*l*., and formerly the appointment was worth about 1,000*l*.—*Elgin Courant and Courier.*

Sanitary and Engineering News.

THE NEW HARBOUR AT CRASTER.—For many months operations have been in progress in the formation of a harbour at the north Northumbrian fishing village, Craster. The rock-bound coast has always presented difficulties to the fishermen in the way of landing in certains winds; and the harbour in question, which is a memorial, will do away with these serious drawbacks. The additional use of the little seaport as a means of sending southwards the stone from local quarries will require further accommodation for workmen and their families. To meet this want Messrs. McLaren, Christonbank, have acquired sufficient land for the erection of sixteen houses upon it. They will be semi-detached, or built in couples. The plans will be arranged by Mr. M. Temple Wilson, architect, Alnwick. Craster Tower, near the village, has one of the fine peles that were the strongholds of the local gentry in times past.

Foreign.

FRANCE.—The Académie des Beaux-Arts have elected M. Edmond de Rothschild an Honorary Member, in place of the late M. Henri Bouchot.——M. Dernaz, architect to the Post Office and Telegraph Department, has been appointed architect to the Senate, in place of the late M. Scellier de Gisors.——M. Pellotier, architect, of Lous-le-Saunier, has been elected President of the District Architectural Society of l'Ain, Jura, and Saône-et-Loire.——Work is to be commenced shortly for the enlargment of the railway station at Gaunat (Allier), at a cost of 3,700,000 francs.——The third International Art Exhibition at Cannes will be held from December 26 to February 1. An International Art Exhibition is to be held at Bordeaux from May to September of next year. The forty-third Exhibition of the Société des Amis des Arts of Pau will be held from January 15 to March 15.——At the ancient castle of the Popes at Avignon some fine fresco paintings have been discovered on the walls of the principal rooms, which had been plastered over at the time that this remarkable building was adapted for a barracks.——The General Council of the Seine has commissioned four painters—MM. Pape, Menu, André Humbert, and Crebassa, to decorate the Salle des Fêtes and the main staircase of the Hôtel-de-Ville of Noisy-le-Sec.——M. Béringuier has been commissioned to decorate with paintings the council-room of the Mairie of Clichy.——A Departmental Almshouse is to be

installed in the Château de Mirabeau (Puy de Dome), at an estimated expense of 270,000 francs.——A vote of 90,000 francs has been passed towards the erection of a higher-grade school for young girls at Prades (Pyrénées Orientales).——The death is announced, at the age of 70, of M. Louis Damaille, sculptor, pupil of Emile Lecomte and of the Ecole des Beaux-Arts. His first exhibit at the Salon, in 1863, was a group of "Hercules strangling the serpents." He obtained a medal in 1866 and "second medal" in 1885, as well as an Honourable Mention at the 1900 Exhibition. His last work, which is not fully completed, was a decorative figure in stone for the façade of the Mairie of the Xth arrondissement.

GERMANY.—The German Society of Architects and Engineers has revised the curriculum for instruction in the Building Section in technical schools. The result of many years of consideration has led them to decide that these schools shall not propose to train architects, but only to give thorough tuition in construction and practical matters; that more of the training shall be carried out in the workshop and on an actual building; that less time be devoted to developing the artistic side of the student; and that complete education cannot be obtained in a school, but must be acquired by actual practice. ——There is great excitement in Mainz regarding the fate of the ruins of the Roman aquadact dating from Domitian, just without the town. These ruins consist of sixty piers, some 7 metres high. In the majority of them the concrete core alone remains, though some of them retain their stone facing. The only other similar ruins in Germany are to be found near Metz, so that their rarity should be their safeguard. In the project for extending the town these piers would be surrounded by tall blocks of flats which would destroy their effect. The next step would be to destroy the piers themselves, in order to increase facilities for traffic.——The Emperor has subscribed 10,000 marks towards the restoration of the church of St. Lawrence, Nuremberg, which, after Regensburg Cathedral, is the most important Gothic monument in Bavaria. The restorations necessitated by the bad weathering quality of the stone were begun in 1904. Professor J. Schmitz is directing the work, which will extend over a period of six to eight years, if the funds are forthcoming to carry out even the most urgent repairs.——In the competition for Municipal Buildings, Neustadt, West Prussia, the first prize of 1,000 marks was awarded to Messrs. Herrfahrth & Wilde, of Charlottenburg.—— Professor Adolf Brütt, of Berlin, has won the limited competition for designs for a monument to be erected in Berlin University to Mommsen. Each of the seven artists invited to compete was given an indemnity of 2,000 marks. In the prize design the seated figure of the historian is of white marble.

BULGARIA.—The Bulgarian Government announces an international competition for designs for a university in Sofia. Designs to be sent in from April 1 to 14, 1907. Three prizes are offered—10,000, 7,000, and 5,000 francs.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. Henry B. Downs, architect, has removed his offices from 10 and 11, Lime-street, London, to South-street, Braunton, North Devon.—— The Indestructible Paint Company have removed their offices from 31, Cannon-street to King's House, King-street, Cheapside, E.C.—— Owing to the building of the Liverpool Offices of Messrs. G. A. Watson & Co., Ltd., coming down, they have removed their head offices to "Shamrock House," 10, Little College-street, Westminster Abbey, S.W. The late London offices at 32, Gt. George-street, have also been transferred to "Shamrock House." The new Liverpool branch office is now 3, Cross Hall-street, Liverpool.

MEMORIAL TABLET, LYNDHURST.—A brass tablet has been placed in St. Michael's Church, Lyndhurst, to the memory of the late Mr. James Edward Bateman Dashwood, of the Foreign Office. The tablet is erected in the north transept of the church, and is engraved on "latten" brass. It was executed by Mr. Gawthorp, of London, and fixed by Mr. Ellery, stonemason, of Lyndhurst.

WEST WALTON CHURCH, NORFOLK.—A fund is open for the reparation, at an estimated cost of 1,500*l*., of the parish church of West Walton, near Wisbech. The church, dedicated to St. Mary, presents many interesting features of the early and Decorated English styles. The tower stands upon four arches, detached: it rises in three stages, with parapet and pinnacles, forming a gateway into the churchyard. The nave and aisle roofs are greatly in need of repair. The tower has been injured by lightning, its pinnacles are broken, and the bell-frames are insecure. The old North door was preferred when the aisles were widened: a beautiful early English window is on the South side.

THE BUILDING-LINE OF PENTONVILLE-ROAD.—In the printed Parliamentary Papers Mr. Horniman asks the President of the Board of Trade whether his attention has been drawn to the decision of the Tribunal of Appeal in the case of an appeal by the owners of the premises Nos. 190-208, Pentonville-road, against the certificate of the Superintending Architect of Metropolitan Buildings defining the generalline of buildings on the north side of Pentonville-road between Southampton-street and North-street; whether he is aware that the effect of the decision will be to make it lawful to erect buildings 80 ft. in height in place of the existing one-story shops; and whether, in view of the desirability of wide thoroughfares and of the fact that the advisory board of engineers, in their Report to the Royal Commission on London Traffic, pointed out that an Act of Parliament of 1756 enacted that no buildings should be erected within 50 ft. of the sides of the Pentonville, Euston, and Marylebone roads, and urged that the principle on which the Act was based should now be acted on, he can see his way to take immediate action to prevent the air space and width of thoroughfares like the Pentonville-road being seriously diminished.—Mr. John Burns, who replies to the question, states that the facts are substantially correct. The Tribunal of Appeal had, however, expressed their willingness to state a case for the opinion of the High Court, and the London County Council are taking steps to get a case stated.

ROYAL COMMISSION ON DRAINAGE.—Replying to a question raised by Mr. J. P. Farrell, in the Parliamentary Papers, Mr. Bryce states that the Royal Commission on Drainage hope to present their Report on Arterial Drainage in Ireland early next month.

MODEL HOUSING EXHIBITION, WOLVERHAMPTON.—We hear that there is a scheme for establishing a model village for the Midlands on the outskirts of Wolverhampton. It is proposed to carry out the scheme on an estate of about 400 acres two miles from the centre of the town, and at from 450 ft. to 500 ft. above sea-level. Sir Richard Paget, the owner of the estate, recognises the necessity of preventing the continued erection of crowded rows of dwellings, and desires to develop the estate on lines which will secure healthy and adequate housing accommodation for the inhabitants. The design of the whole area is being prepared in advance. Provision will be made for wide roads, and open spaces for gardening and recreation. The plan of development is being prepared by Mr. Detmar Blow and Mr. Fernand Billerey, architects, of London; and Mr. Thomas Adams, late Secretary and Manager of the First Garden City, Ltd., is acting as agent for the owner in carrying out the scheme. It is proposed to hold a model housing exhibition on the estate in the late summer and autumn of 1907, when prices amounting to at least 250*l*. will be awarded for the best houses containing four and five rooms, and erected at a cost not exceeding 250*l*. Architects and builders in the Midlands who are likely to be interested in the exhibition, can obtain full particulars from the Secretary, Gresham-chambers, Lichfield-street, Wolverhampton.

SEWER VENTILATION, MANCHESTER.—The Manchester Corporation Special Committee on Ventilation of Sewers, presided over by Councillor James Johnston, received a report, on the 13th inst., of examinations of eleven tramway poles fixed in Wilmslow-road, specially constructed with the idea of assisting in the ventilation of sewers. The poles, it was stated, appeared to have done their work in a fairly effective manner, drawing the gas from the sewers and discharging it at a height of twenty-five feet above the street level. The Withington Special Committee had ordered a further number of these poles to be fixed in its own district. It was decided by the Sewers Ventilation Committee that the City Surveyor should select a suitable area on which to carry out a fairly extensive series of experiments by means of poles of the kind referred to or by pipes fixed to the gables of houses, and arrangements should be made with Professor Sheridan Delepine to begin an investigation as to the effect of sewer gas on the health of the community in such quantities as it may escape from the traps and grids, whether in fact these appliances lead to any ill-effects beyond offensive smells. These experiments will probably extend over a couple of years. The City Surveyor was instructed to ascertain what would be their probable cost. An exhaustive report of the committee, which will probably be presented to the Council at its next meeting, has been prepared by the Chairman and the City Surveyor, covering the whole of the work of the committee since its formation six years ago. In April, 1901, it was suggested by Mr. De Courcy Meade that the sewers should be systematically ventilated by sufficient upcast shafts placed in suitable positions, that the surface ventilators should be utilised as inlets for fresh air, and that manufacturers' refuse containing chemicals liable to generate explosive or other dangerous gases in the sewers should be rigidly excluded. Since that period many proprietary methods of ventilation of sewers have been tested, Dr. Delepine has undertaken bacteriological work, and Dr. Gilbert Fowler has carried out chemical labours in connexion with the committee's proceedings. None of these proprietary systems, says the report, can be recommended for use in the Manchester sewers. It is, however, recommended that a station be provided where bacteriological and chemical observations of a serial and continuous character can be carried out with the precautions necessary to secure accuracy. Professor Delepine considers that the Public Health Laboratory Grounds, which run along High-street and York-place, might at small cost be made a point of observation. Dr. Delepine got together a fair amount of apparatus in 1903 with the object of clearing up the question of the influence of sewer air on health, but owing to the removal of his laboratory it had been found impracticable to fix a station for its complete study.—*Manchester Courier.*

THE FIRE IN DORSET-ROAD.—Messrs. L. Whitehead & Co. wish to state that the serious fire at their storeyard, in Dorset-road, which was prominently noticed in the daily Press of the 13th inst., has not in any way affected their workshops, stables, and main yard in Portland-place North, and in no way inconveniences them except as regards loss of stock. Their business is, therefore, being carried on as usual.

SCOTTISH BUILDERS AND SCAFFOLDING.—The Scottish Building Trades Federation, of which the headquarters are in Edinburgh, have sent a petition to the Home Secretary with reference to the proposed regulations as to the erection of scaffolding and measures for the safeguarding of the lives of workmen while employed in the erection or repair of buildings. The Federation urge that if the regulations are to apply to Scotland the Scottish Building Trades should be directly represented on the Department Committee appointed by Mr. Gladstone to inquire into the subject. The different centres of the Federation throughout Scotland have been communicated with, in order that witnesses may be sent from Aberdeen, Dundee, Inverness, Glasgow, and Edinburgh to give evidence before the committee. Mr. W. Graham Yool, president of the Building Trades' Exchange, of the City and District of Edinburgh, made reference to the proposed regulations at the dinner of the building trades in Edinburgh, on the 13th inst., and said that the framers of the regulations knew absolutely nothing about the conditions which obtained as to the erection of scaffolding and the way building operations were carried out in Scotland. The regulations required to be seriously considered by all interested in the building trade.

EDINBURGH, LEITH, AND DISTRICT BUILDING TRADES' ASSOCIATION.—The annual dinner of the Edinburgh, Leith, and District Building Trades' Association and the Building Trades' Exchange of the city and district of Edinburgh was held in the Royal British Hotel, Edinburgh, on the 13th inst. Mr. Patrick Knox presided, and the croupiers were Councillor Neil M'Leod, Parish Councillor Wilson, and Mr. James Millar. Several representatives were present from Glasgow and other kindred associations. The toast of "the Corporations of Edinburgh and Leith" was proposed by Mr. David Mekie, Councillor Forrest replying for Edinburgh, and Councillor Cochrane for Leith. The toast of the two associations was proposed by Mr. W. H. Baxter, Glasgow. Councillor M'Leod replied for the Building Trades' Association, and Mr. W. Graham Yooll, Leith, for the Building Trades' Exchange. The latter said if the country succeeded, as it ought to succeed, in retaining its cavalry, there would be new barracks to build in Scotland. "Kindred Associations" was proposed by Mr. W. Patterson; and Mr. James Somerville (Vice-President of the Glasgow Plumbers' Association) and Mr. W. Brims (Edinburgh and Leith House Factors' Association) replied. Mr. Hippolyte J. Blanc, R.S.A., and Mr. J. C. Hamilton (Edinburgh Ordained Surveyors' Society) responded to the toast of "The Architects and Surveyors," proposed by Mr. James Millar.

A NOVEL ADVERTISEMENT.—The Linolite Company have started a delivery van with notices lighted by lengths of linolite affixed to the van, and run on a 110 volt circuit by means of a small petrol motor direct coupled to a 3-h.p. dynamo.

Capital and Labour.

STATE OF THE BUILDING TRADES.—Employment continued dull on the whole. It showed little general change compared with a month ago, but was better than a year ago. Returns received from firms employing 60,671 workpeople at the end of November show a decline in the numbers employed of 2,298, or 3·6 per cent., compared with a month ago. Returns from trade unions of carpenters and joiners and of plumbers show that an improvement took place in these trades during the month. The percentage unemployed of trade union carpenters and joiners in the United Kingdom was 6·9, as

compared with 7·6 a month ago, and 8·3 a year ago; and of plumbers 6·9 per cent. were unemployed at the end of November, as compared with 8·0 a month ago, and 11·1 in November, 1905. In London 8·2 per cent. of carpenters and joiners were unemployed at the end of November, as compared with 9·0 a month ago, and 10·2 a year ago. With plumbers the percentage unemployed was 11·9, as compared with 12·2 a month ago and 14·6 a year ago. Employment was dull generally except with slaters, and with plasterers in Scotland, who were fairly well employed. Compared with a month ago some improvement was reported by slaters, and also by stonemasons in England, and plasterers and painters in Scotland; some decline was reported by painters in England, and stonemasons in Scotland. Compared with a year ago there was an improvement with slaters, and also with stonemasons in England, and plasterers in Scotland; a decline was reported by stonemasons and painters in Scotland. Bricklayers reported little change in employment compared with a month ago and a year ago.—*Labour Gazette.*

Legal.

APPEAL BY A STONEMASON.

THE case of W. Thornton & Sons *v.* James M'Arthur came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Cozens-Hardy and Farwell, last week, on the defendant's appeal against an order of the Liverpool County Court judge on an application by the plaintiffs to review an award under the Workmen's Compensation Act, 1897.

It appeared that James M'Arthur, a stonemason, while in the employment of Messrs. Thornton & Sons, of Liverpool, in January, 1906, was engaged in removing scaffolding on the new tramway offices in Hatton-gardens, Liverpool, and whilst so engaged met with an accident, the effect of which was to incapacitate him from work. It was admitted that the workman was entitled to receive compensation under the Act, and by an agreement dated February 7, 1906, the employers agreed to pay him a weekly sum of 17s. 10d. This agreement was in the usual form, and was filed with the Registrar. Shortly afterwards the man was sentenced by the stipendiary to six weeks' imprisonment for some small misdemeanour. During his incarceration the employer's doctor called several times at the workman's house for the purpose of medically examining him, but of course failed to find him. The employers then applied to the County Court judge to suspend the payments on the ground that the man had refused to undergo a medical examination. They then for the first time heard that the man was in prison, and the application was adjourned to enable the man to be examined by a doctor. The examination took place, and the employers resumed their application, asking that the weekly payments should be determined on the ground that the man was no longer incapacitated from work. The County Court judge reduced the weekly payments from 17s. 10d. to 10s. a week. Hence the present appeal of the workman.

On behalf of the appellant it was contended that the learned County Court judge was wrong in diminishing the payments when the only application before him was to determine the payments; and secondly, that there was no evidence of improvement in the man's working capacity.

In the result their lordships affirmed the decision of the learned County Court judge, and dismissed the appeal with costs.

PONTYPRIDD BUILDING DISPUTE.

THE case of Jones *v.* Lewis came before a Divisional Court of King's Bench, consisting of Justices Darling and Bray, on the 16th inst., on the plaintiff's appeal from a judgment of the official referee.

The plaintiff was Mr. Charles Benjamin Smith Jones, carrying on business as a builder under the style of Smith, Jones, & Co., and the defendant was a Mrs. Emma L. Lewis. The plaintiff entered into an arrangement to build a house for the defendant on the Park Estate, Treforest. The defendant had already obtained plans and specifications from a Mr. A. O. Evans, an architect, and she wanted tenders, and the question in the case was whether the specifications formed part of the contract. The Official Referee found that it was a term of the contract made between the plaintiff and the defendant that the house should be erected for 550*l.*, in accordance with the plans and specifications referred to; that the plaintiff was entitled to recover 100*l.* balance of the contract sum, also 51*l.* 12s. 6d. and 26*l.* 17s. 4d., part of 70*l.* 1s. 3d. of extra work, making 178*l.* 19s. 10d. He further held that the defendant was entitled to recover in respect of her counterclaim 220*l.* 9s., leaving, after allowing for the 178*l.* 19s. 10d., a balance due to the defendant of 41*l.* odd. Plaintiff now appealed against this award and sought to set it aside.

Mr. Abel Thomas, K.C., on behalf of the appellant, said the tenders the defendant had received ranged from 820*l.* to 995*l.* Under the award the defendant was to get the house for 550*l.*, and was to get 220*l.* back. She was thus getting the house for 330*l.*—a magnificent bargain.

Mr. Justice Bray: I don't know that I should call it a magnificent house.

Their lordships in the result affirmed the decision of the learned Official Referee, and dismissed the appeal with costs.

PROPERTY DAMAGED BY PUMPING.

THE hearing of the case of Fletcher's Executor *v.* the Corporation of Birkenhead concluded in the Court of Appeal, before the Master of the Rolls and Lords Justices Cozens-Hardy and Farwell, on the 18th inst., on the defendants' appeal from a judgment of Mr. Justice Bray at the Liverpool Assizes. His lordship gave judgment in favour of the plaintiff, who had since died, and his executor now presented the present appeal.

It appeared that the late Mr. Isaac Fletcher, of Seaton Lodge, Upton, on November 18, 1904, gave notice to the Birkenhead Corporation, claiming compensation in that they by the exercise of the Birkenhead Corporation (Gas and Water) Act, 1881, and other Acts incorporated therewith, had injuriously affected premises known as Brookside, Upton, belonging to the plaintiff. It seemed that the property in question adjoined land acquired by the Corporation in pursuance of the powers conferred upon them. On this land they sank a well and erected a pumping station, and the plaintiff alleged that the effect of the pumping was to draw silt from underneath his house so that the building was let down. The matter went to arbitration, and the umpire found that the Corporation had, by the authorised working after the completion of the authorised works, occasioned damage to the property of the claimant by from time to time taking such water as was found in and under the lands taken by the Corporation for constructing their works. Such damage, however, was not occasioned by the abstraction of water only, but by the abstraction of water which carried with it silt from under the premises of the claimant. The umpire fixed the compensation at 1,200*l.* The matter then came before Mr. Justice Bray on questions of law. In a case under the Railway Clauses Act the House of Lords had decided that no compensation was recoverable in respect of authorised workings, and it was contended in the present case that inasmuch as the umpire had found that the damage arose from the authorised working after the completion of the works the same principles applied, and no compensation was recoverable. Mr. Justice Bray, in finding for the plaintiff, based his decision on his view of the sections of the Waterworks Clauses Act, and said it was extremely unsatisfactory to apply the judgment of the House of Lords upon one Act of Parliament to another Act of Parliament. Hence the present appeal, in support of which it was contended that the considerations applied by the House of Lords to the case under the Railway Clauses Act applied to the present case under the Waterworks Clauses Act.

At the conclusion of the arguments of counsel, their lordships affirmed the decision of Mr. Justice Bray, and dismissed the appeal with costs.

A stay of execution was granted pending an appeal to the House of Lords, the Corporation agreeing to pay 4 per cent. on the sum involved in the event of the appeal proving unsuccessful.

Mr. Horridge, K.C., and Mr. F. E. Smith, M.P., appeared for the appellants; and Mr. Pickford, K.C., and Mr. Leslie Scott for the respondent on the appeal.

Patents of the Week.

APPLICATIONS PUBLISHED.*

16,681 of 1905.—J. R. CRAIG: *Apparatus for the Production of Ozone from Oxygen or Atmospheric Air, and its Application for Ventilation and other Purposes.*

THIS relates to an apparatus for the production of ozone from oxygen or atmospheric air, and consists in the arrangement upon a metallic frame, capable of removal from the outer casing of the ozonising apparatus, of electrodes insulated from said frame, and alternating with baffle plates or rings.

23,394 of 1905.—J. D. MCCABE: *Knives of Clay-mixing Machines.*

This relates to a knife of a clay-mixing machine cast in two parts. The parts can be fastened together in three different ways—namely, clutched and fastened with a split pin, clutched and bolted through the centre, and screwed clutch and nut.

23,768 of 1905.—E. TAYLOR: *Draught Improvers for Consuming Smoke in Steam Boiler Furnaces, Domestic Fireplaces, and the like.*

This relates to a draught improver and smoke consumer, and consists in the use of a number of metal plates placed one above the other and held in such a manner as to form a number of air spaces between the said plates.

23,816 of 1905.—H. PETERS: *Manufacture of Portland Cement and Apparatus for Use therewith.*

This relates to an apparatus for the removal of dried mixtures of slurry and fuel from the floors of rectangular drying chambers in connexion with ordinary vertical cement-burning kilns, and consists essentially of rakes mounted in the said chambers and an arrangement for causing to-and-fro motion of the said rakes in the said chambers.

23,870 of 1905.—G. T. FOLEY: *Smoke and Down-draught Preventing Device for Chimneys.*

This relates to a self-contained down-draught preventing device and extracting device for smoke, foul air, dust, or the like, for chimneys, ventilating and other conduits, and consists of a casing built in the chimney or conduit wall provided with fixed or removable inclined louvre plates, sides permanently fixed to the casing, and extending into the chimney, and a plate carried by the casing pivoted to its lower end and adapted to be adjustable.

24,397 of 1905.—J. LEEMING and A. GREENHALGH: *Hydraulic Presses.*

This consists in a combination with a hydraulic press or presses, and an intensifier of a series of hydraulic cylinders and controlling valves in addition to the necessary back pressure valves placed in the pipe connexions between the water main or source of supply and the press and operating automatically to raise the initial pressure from the source of supply on the press ram to the maximum pressure required.

25,162 of 1905.—M. G. WOOD: *Locks and Latches.*

This relates to a lock or latch, and consists in the arrangement wherein the bolt and latch proper is made of a stirrup-like shape so as to embrace the other part of the bolt to which the levers or tumblers are pivoted.

450 of 1906.—T. HARRIS: *Drainage Ventilating Shafts or Air Inlets.*

This relates to drainage ventilating shafts, and consists of a gully of such size and shape as shall admit of being placed wholly inside a vertical drain or sewer pipe, except the socket wherewith it is hung in position on such pipe, and shall leave an annular space between the outside of the gully and the inside of the drain or sewer pipe. It provides, through openings formed in the side, for the admission of fresh air and water into the drain wherein it is fixed; any detritus entering said gully drops into the well, which is formed below the side openings or water line, and which prevents any substance entering such drain or sewer that may cause obstruction.

2,565 of 1906.—A. F. MORRISON and M. INGRAM: *Baths, Lavatories, Sinks, and the like.*

This relates to baths, lavatories, and the like, and consists in making the bath, landing sink, or the like, with a lip or edge around the receptacle to prevent or minimise the chances of splashing over when a fluid is agitated therein. To secure this the upper edge of the said receptacle is made curved inwards and finished in a form known as "bird's head and beak," which tends to turn back a fluid agitated within the receptacles instead of it washing over, as frequently happens with receptacles of the ordinary kind.

3,196 of 1906.—G. and W. G. GUMMER, LTD., and G. GUMMER: *Bath Valves and the like Water Fittings.*

This relates to bath valves and the like water fittings, and consists in the arrangement and combination of parts and appliances comprising a screw-down valve for both hot and cold water, arranged and constructed so that the discharge of either cold, tepid, or hot water can be caused to flow, and to be regulated by two ports in the said valve, and so that hot water cannot possibly be turned on first.

3,782 of 1906.—L. OGET: *Portable Buildings.*

This relates to a portable building composed of wooden panels assembled edgewise one with the other, and is characterised by the fact that there are fixed to the four sides or edges of the panels, shaped metal bands fitting each other, each of said panels being provided with hooks, and those opposite to and engaging them being provided with mortises for the reception of the said hooks in such a manner that the employment of bolts or nails for the assemblage is avoided.

6,700 of 1906.—W. MUESER: *Bars for Concrete Steel.*

This relates to a bar adapted to be used as a core to be embedded in a concrete envelope,

PATENTS,—*Continued on page 739.*

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x. Public Appointments, xvi.; Auction Sales, xxvi.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

Competitions.

FEBRUARY 6.—**Galway.**—HOSPITAL.—Galway Board of Guardians invite plans and estimates of a fever hospital proposed to be erected at Galway. A premium of 25*l.* will be given; but in the event of the Guardians deciding to give the supervision of the building to the architect or engineer whose plan has been accepted, this premium will be merged in his fees. The selection will be made by an architect or engineer having no interest in the business. Particulars as to hospital accommodation, etc., required, will be furnished by Mr. Robt. F. Mullery, Clerk of Union, Galway. The plans will be received up to 11 o'clock a.m. on February 6.

Contracts.

BUILDING.

* DECEMBER 25.—**Worcester.**—WAREHOUSE AND OFFICES.—Builders desirous of tendering for new warehouse and offices at Worcester, for Messrs. Ray's, Ltd., should apply to Messrs. Simpson & Ayrton, architects, 3, Verulam-buildings, Gray's-inn, W.C., on or before December 25. Plans may be seen, and bills of quantities obtained, for which a deposit of 2*l.* 2*s.* will be charged.

DECEMBER 26.—**East Preston.**—COVERED WAY, ETC.—East Preston Guardians invite tenders for the following works at the Workhouse:—(1) The construction of a screening-chamber on the Workhouse main drain; (2) the erection of a covered way; (3) the erection of boundary walls and fences, and making-up grounds. Plans and specifications may be seen at the office of the architect, Mr. Harold M. Potter, 41A, Warwick-street, Worthing. Tenders, endorsed "Tender for Covered Way, etc.," must reach Mr. Arthur Shelley, Clerk, Town Offices, Littlehampton, not later than December 26.

DECEMBER 26.—**Oldham.**—ALTERATIONS TO BATHS.—Oldham Markets and Baths Committee invite tenders for proposed alterations and additions to the boys' swimming baths at the Central Baths, Union-street. Plans can be seen, and bills of quantities and form of tender obtained, at the office of the Borough Surveyor. Sealed tenders, endorsed "Tender for Alterations at Boys' Swimming Bath," and addressed to the Chairman of the Markets and Baths Committee, to be returned not later than December 26.

DECEMBER 27.—**Bridlington.**—ADDITIONS TO CHAPEL.—For additions to St. John's Wesleyan Chapel. Drawings, etc., may be inspected at the office of Mr. J. Earnshaw, architect, Carlton House, Bridlington, and sealed and endorsed tenders are to be delivered by 5 p.m. on December 27.

DECEMBER 28.—**Golcar.**—HOUSE.—The erection of a dwelling-house in Carr Top-lane, Golcar. Plans may be seen, and quantities obtained, at office of Messrs. P. Taylor & Co., architects, Central-buildings, Milnsbridge, from December 21 to 28, on which latter day tenders must be delivered not later than 12 o'clock noon.

DECEMBER 28.—**Paddock.**—HOUSES.—The erection of eight dwelling-houses in Branch-street, Paddock. Plans may be seen, and quantities obtained, at Milnsbridge offices of Messrs. Lunn & Kaye, architects and surveyors, Milnsbridge and Huddersfield, from December 18 to 28, on which latter date sealed and endorsed tenders must be delivered not later than 5.30 p.m., free of charge.

DECEMBER 28.—**Ripley.**—TOWN HALL ALTERATIONS.—The Ripley U.D.C. invite tenders for new offices and public urinal, and also an additional staircase, at the Town Hall, Ripley, Derby. The drawings can be seen, and specification, bill of quantities, and form of tender obtained, from Mr. G. W. Bird, C.E., Surveyor, Town Hall, Ripley, Derby, upon payment of 2*l.* 2*s.* Sealed tenders, endorsed "Town Hall Alterations," must be delivered at the office of Mr. Geo. M. Capon, Clerk of the U.D.C., Public Offices, Ripley, Derby, on or before December 28.

DECEMBER 28.—**Warwick.**—WORK-SHED.—For erection of a work-shed at the Workhouse, Warwick, for the Guardians. Plan and specification may be seen at the office of Mr. F. P. Trepess, F.I.A.S., 1, Church-street, Warwick, any day (except Saturday) between 10 a.m. and 4 p.m. Tenders, sealed, and endorsed "Tender for Work-shed," addressed to Mr. C. H. Passman, Clerk to the Guardians, 48, Bedford-street, Leamington Spa, must be delivered by 9 a.m. on December 28.

DECEMBER 28.—**Widnes.**—ENGINE-HOUSE.—Widnes Corporation invite tenders for the erection of an engine and boiler house at their Stockswell pumping-station. Copies of specification, conditions of contract, and bill of quantities may be obtained, and the plans inspected, on application to the Water Engineer, Widnes, and on payment of 2*l.* 2*s.* Tenders, endorsed "Engine and Boiler House," must be addressed to the Chairman of the Gas and Water Committee, and delivered at the Town Hall, Widnes, on or before noon on December 28.

DECEMBER 29.—**Portumna.**—COTTAGES.—Portumna R.D.C. will on December 29, receive tenders for the building of twenty-seven labourers' cottages, singly, in accordance with plan and specification to be seen with Mr. M. Lavan, Clerk to the Council, Office, Union Workhouse, Portumna. The Council will also receive tenders for the fencing of the plots upon which the cottages are to be erected. Tenders must be on official forms, to be had of the Clerk.

DECEMBER 31.—**Porthcawl.**—HOUSE.—For erection of a dwelling-house at Porthcawl, for Mr. William Jenkins. Particulars at the offices of Messrs. Geo. F. Lambert & Son, Bridgend, or at Gadlys, South-road, Porthcawl. Tenders to be sent in by December 31.

DECEMBER 31.—**Portobello, Edinburgh.**—SCHOOL WORKS.—Edinburgh School Board invite estimates for executing the following works in connexion with the extension of Tower Bank School, Portobello:—(1) Mason and brick works; (2) carpenter and joiner works; (3) smith work; (4) slater work; (5) plaster and cement works; (6) plumber work; (7) painter work. Plans and specifications may be seen, and schedules and measurements may be obtained, at the office of Mr. Carfrae, architect, 3, Queen-street. Estimates, marked outside "Estimates for —— Work for Tower Bank School," to be sent to Mr. Geo. W. Alexander, Clerk to the Board, School Board Offices, Castle-terrace, Edinburgh, not later than December 31.

JANUARY 1.—**Nottingham.**—SCHOOL.—Nottingham Education Committee invite tenders for the erection of a mixed school, and additions to the infants' school, Sneinton-boulevard. Plans may be seen at, and copies of the specification, bill of quantities, and form of tender obtained, from the office of the City Architect, Mr. Frank B. Lewis, Guildhall, on payment of a deposit of 2*l.* 2*s.* Sealed tenders, addressed to Mr. W. J. Abel, Clerk, Education Offices, Victoria-street, to be delivered not later than 10 a.m. on January 1.

JANUARY 1.—**Ruthin.**—COUNTY OFFICES.—Denbighshire C.C. invite tenders, based on bills of quantities to be supplied, for the erection of new county offices, Ruthin. Names, together with a deposit of 1*l.* 1*s.*, to the County Architect and Surveyor, Mr. Walter D. Wiles, 42A, High-street, Wrexham, on or before January 1.

JANUARY 2.—**Rambledon.**—ADDITIONS TO DORMITORY, ETC.—Hambledon Guardians invite tenders for (*a*) carrying-out certain small additions to the young women's dormitory; and (*b*) the erection of a range of earth-closets and the extension of the lavatory accommodation in the men's quarters, at the Union Workhouse, Hambledon. A plan and specification of the proposed work can be seen on application to the Board's Architect, Mr. Edward L. Lunn, 36, High-street, Guildford. Sealed and endorsed tenders are to be delivered to Mr. Ferdinand Smallpeice, Clerk to the Guardians, 138, High-street, Guildford, not later than 2 o'clock on January 2.

* JANUARY 4.—**Catford.**—SORTING OFFICE.—The Commissioners of H.M. Office of Works, etc., invite tenders for enlargement of the sorting office at Catford, S.E. Drawings, specifications, may be seen on application to Mr. J. Wayer, H.M. Office of Works, S.W. Bills of quantities and forms of tender may be obtained from the Secretary, H.M. Office of Works, Storey's Gate, S.W., to whom tenders, endorsed "Tender for Catford Sorting Office Enlargement," must be delivered not later than 12 noon, January 4.

JANUARY 5.—**Warwicksland.**—WALL, ETC.—The erection of a wall and iron railing at Warwicksland School. Plans and Specifications will be shown by Mr. Roden, School House, Penton. Tenders to be sent in on or before January 5, addressed to School Managers, and endorsed "Tender for Wall."

* JANUARY 7.—**Leek.**—ENGINE-HOUSE, ETC.—Leek U.D.C. invite tenders for building coal-breaker, waggon-tipper, and weighbridge pits, gas-engine house, tunnel under Newcastle-road, and other works at the Gasworks, near Leek Station. Plans, specifications, and stipulations may be seen, and copies of specifications, bills of quantities, and form of tender obtained, from the Council's Surveyor, Town Hall, Leek. Sealed tenders, on form supplied, and priced quantities (under separate cover), endorsed "Building for Coal-handling Plant," and addressed to the Chairman of the Gas Committee, to be delivered to the Surveyor, as above, before noon, January 7.

JANUARY 7.—**Milford.**—MANSE.—For erection of a manse in Milford, Co. Donegal. Plans, etc., can be seen with Mr. John M. Robinson, architect, 7, Eastwall, Londonderry, or with Mr. R. M'Causland, Milford. Sealed and endorsed tenders to be delivered to Mr. R. M'Causland, Milford, by January 7.

JANUARY 8.—**Greenland.**—SCHOOL.—Durham County Education Authority invite tenders for new Council school at South Moor, Greenland, for about 950 scholars. Plans, etc., can be seen, and bills of quantities obtained, at the office of the architects, Messrs. Clark & Moscrop, Feetham, Darlington. Sealed tenders, endorsed "South Moor, Greenland, Council School—Tender," are to be sent on or before January 8, addressed to the Secretary, Elementary Education Department, Shire Hall, Durham.

* JANUARY 9.—**Margate.**—LAUNDRY MAIDS' QUARTERS.—The Metropolitan Asylums Board invite tenders for erection of laundry maids' quarters at East Cliff House, Cliftonville Margate, in accordance with drawings and specifications by the Engineer-in-Chief. Drawings, specifications, conditions of contract, and form of tender can be inspected at the Board's Office, Embankment, E.C., on and after December 27. Tenders, addressed as noted on form, to be delivered at the Board's Office not later than 10 a.m., January 9.

JANUARY 10.—**Dunning.**—POLICE-STATION.—For the building works required in the erection of a police-station at Dunning, Scotland. Plans, etc., may be seen at the office of Mr. David Smart, architect, Perth, from whom schedules of measurement and further particulars can be obtained, and endorsed, sealed tenders must be lodged with Mr. David Marshall, County Clerk, County Buildings, Perth, by January 10.

* JANUARY 11.—**Berks.**—NEW SCHOOL.—The Berkshire Education Committee invite tenders for a new school for 250 scholars at Swallowfield, Berks. Names to the Secretary of the Education Committee, The Forbury, Reading, on or before January 2, together with deposit of 2*l.* 2*s.* for bills of quantities. Plans, specification, and form of contract may be seen at the Education Secretary's Office on and after January 2. Tenders to Education Secretary, on the form and in the envelope provided, not later than first post, January 11.

JANUARY 12.—**Loughrea.**—ADDITIONS, ETC., TO CHURCHES.—For additions and improvements to the churches of Abbey and Duniry, Loughrea, Co. Galway. Plans, etc., can be seen at Duniry, and office of Mr. W. A. Scott, A.R.I.B.A., 45, Mountjoy-square, Dublin, architect. Sealed tenders, marked "Abbey and Duniry Churches," to be sent to the Rev. P. Egan, P.P., Duniry, to arrive on or before January 12.

* JANUARY 14.—**Totton.**—NEW SCHOOL, ETC.—The C.C. of Southampton invite tenders for (1) the erection of a new school at Totton; (2) the installation of low-pressure hot-water apparatus therein. Plans, specification, and conditions of contract may be seen, and bills of quantities obtained, at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester, on and after December 31. A deposit of 2*l.* 2*s.* will be required for a copy of the bills of quantities for Estimate I., and similar deposit for Estimate II. Tenders, endorsed "County School, Totton," to be delivered to Mr. H. Barber, Clerk to the C.C., The Castle, Winchester, by 10 a.m., January 14.

JANUARY 18.—**Wallsend.**—POLICE BUILDINGS.—Northumberland Standing Joint Committee invite tenders for the whole of the works required in the erection of police buildings, Wallsend. Names to Mr. J. A. Bean, County Architect, The Moot Hall, Newcastle-on-Tyne. Bills of quantities will be forwarded on payment of a deposit of 2*l.* 2*s.* Sealed tenders, sent in the envelopes provided, to be delivered not later than 4 p.m. on January 18.

No DATE.—**Bagillt.**—CHURCH.—For the building of an English Calvinistic Methodist church at Bagillt. Plans and specifications to be had from Mr. Richard Jones, jun., architect, Holywell. Tenders to be sent to Rev. R. G. Jones, Rosscairn, Egremont, Cheshire.

No DATE.—**Reading.**—ADDITIONS, ETC., TO WORKHOUSE.—Reading Guardians invite tenders for additions and alterations at the Workhouse, Oxford-road, Reading. Application in writing to Mr. E. J. W. Huggins, Clerk to the Guardians, 32, Thorn-street, Reading. Plans and specification may then be seen, and forms of tender obtained, between the hours of 10 a.m. and 5 p.m., on applying to the architect, Mr. W. G. A. Hambling, Forest House, Queen's-road, on depositing with him the sum of 1*l.* Tenders must be signed, sealed, and endorsed "Tenders for New Workhouse Buildings, etc.," and delivered to Clerk at the Board-room, Thorn-street, Reading, at such a date as will be hereafter arranged.

No DATE.—**Sherburn.**—COTTAGES.—For erection of cottages near Sherburn. Send address to A 154, The *Yorkshire Post*, Leeds.

No DATE.—**Winterton.**—ALMSHOUSES.—The erection of three almshouses at Winterton, Lincolnshire, for the trustees of the late Mrs. Mary Clarke. Plans may be seen at the Vicarage, Winterton, and bills of quantities obtained from Messrs. Joy, Cross, & Son, solicitors, Barton-on-Humber.

ENGINEERING, IRON, AND STEEL.

DECEMBER 22.—**South Shields.**—ELECTRIC LIGHT.—South Shields T.C. invite tenders for the carrying out of the installation of electric light in all departments of the Dean-road School. The drawings may be inspected at the office of Mr. J. H. Cawthra, M.I.E.E., Borough Electrical Engineer, South Shields, from whom form of tender, etc., may be obtained. Tenders, on the form supplied, must be delivered to the Secretary to the Education Committee at his office, Ocean-road, South Shields, on or before noon on December 22, endorsed "Tender for Wiring, Dean-road School."

DECEMBER 24.—**Greenock.**—PUMPS, ETC.—Greenock and District Combination Hospital Board invite tenders for (1) fire pump and accessories; (2) fire general service pump and accessories; (3) cast-iron tank in water tower; (4) cooking apparatus for new Combination Hospital presently in course of erection at Gateside, Inverkip-road, Greenock, according to plans and specification by Mr. John Dixon, A.M.Inst.M.E., consulting engineer, 219, St. Vincent-street, Glasgow. Schedule of quantities and form of tender can be obtained on application to Mr. Colin MacCulloch, Clerk to the Board, Municipal Buildings, Greenock, on payment of a deposit

of 1*l.* 1s. for each schedule. Sealed tenders, on the prescribed form, must be delivered at the Town Clerk's Office, Greenock, on or before December 24.

DECEMBER 24.—**Nottingham.**—FENCING, ETC.—The Castle Museum and School of Art Committee of the Nottingham Corporation invite tenders for the supply and fixing of about 147 lin. yds. of three-rail wrought-iron unclimbable hurdle fencing and gates, at the foot of the Castle Rock, Castle Boulevard. Plans may be seen, and copies of the specification and form of tender obtained, from Mr. Frank B. Lewis, City Architect, Guildhall, on payment of a deposit of 1*l.* 1s. Sealed tenders to be sent in not later than 10 a.m. on December 24, addressed "The Town Clerk, Guildhall, Nottingham," and endorsed "Tender for Hurdle Fencing, Castle Boulevard."

DECEMBER 26.—**Edinburgh.**—FIRE ESCAPE STAIRS.—Edinburgh P.C. invite tenders for supplying and erecting iron fire escape stairs at Craiglockhart Poorhouse. The drawings and specifications can be seen at the office of Mr. R. M. Cameron, Architect to the Council, 53, Great King-street, Edinburgh. Tenders, marked outside "Tender for Fire Escape Stairs, Craiglockhart," to be lodged with Mr. James Kyd, Clerk, Edinburgh P.C. Chambers, Castle-terrace, not later than 10 a.m. on December 26.

DECEMBER 27.—**Wimbledon.**—SCREENING PLANT AT PUMPING-STATIONS.—Wimbledon Corporation invite tenders for the supply and fixing of electrically-driven screens at their pumping-stations, Durnsford-road and Kingston-road, Raynes Park. Specification and form of tender may be obtained on application to the Borough Engineer, Town Hall, Wimbledon. Sealed tenders, on forms and enclosed in envelopes provided, to be delivered at the Town Hall on or before noon on December 27.

DECEMBER 28.—**Dublin.**—IRON RAILINGS, ETC.—The Improvements Committee of the Corporation invite tenders for the supply of 320 yds. of wrought-iron railings to inclose Recreation Ground at Dollymount. The railings, of Irish manufacture, are to be made and supplied in 6-ft. sections, having round iron bars passing through horizontal bars and riveted underneath, in accordance with the design prepared by the City Engineer, copy of which, with a full memorandum of particulars, can be had on application to office of Mr. Patrick Tobin, Secretary. Tenders, addressed to the Chairman, Improvements Committee, City Hall, and endorsed "Tender for Wrought-iron Railings," must be received by Secretary not later than December 28, at or before 12 o'clock noon.

DECEMBER 31.—**Belfast.**—DYNAMOS AND PLANT.—Belfast Tramways and Electricity Department invite tenders for the following plant:—Specification No. G 1, 1,000 kilowatt steam dynamos; specification No. G 2, condensing plant. Specifications, with form of contract, may be obtained from Mr. Victor A. H. M'Cowen, M.Inst.E.E., M.Inst.M.E., City Electrical Engineer, Belfast, on payment of 2*l.* 2s. each. Sealed tenders, endorsed "Tender for Steam Dynamos," or "Tender for Condensing Plant," shall be lodged with Sir Samuel Black, City Hall, Belfast, not later than 11 a.m. on December 31.

DECEMBER 31.—**Brighton.**—ELECTRIC LIGHT.—The Vicar and Churchwardens of St. Bartholomew's Church, Brighton, invite tenders for the installation of electric light in the church, from local firms only. Tenders must be sent in not later than 6 p.m. on December 31, to 87, London-road, Brighton, where specifications, plan of church, and design of fittings may be obtained.

DECEMBER 31.—**Guildford.**—BOILER, ETC.—Guildford T.C. invite tenders for the supply of a new boiler and heating apparatus, at the public baths. A plan and specification may be seen, and form of tender obtained, on application to Mr. C. G. Mason, C.E., the Borough Surveyor. Sealed tenders, endorsed "Tender for Heating Apparatus," are to be sent to Mr. F. S. Miller, Town Clerk, Town Clerk's Office, Bridge-street, Guildford, on or before December 31, by 12 noon.

DECEMBER 31.—**Kingston-on-Thames.**—ELECTRIC WIRING.—Kingston-upon-Thames Education Committee invite tenders for wiring and fittings for electric lighting at the new Public Elementary Schools in Richmond-road, in accordance with the specification and schedule to be obtained of the Borough Electrical Engineer, at the Central Electric Station, Down Hall-road, Kingston-upon-Thames. Tenders, endorsed "Wiring New Schools," to be delivered at office of Mr. Harold A. Winser, Town Clerk, Town Clerk's Office, Kingston-upon-Thames, not later than December 31.

JANUARY 2.—**London.**—STEEL PLATES.—The East Indian Railway Company invite tenders for the supply and delivery of:—(1) Steel plates, angles, and bars, for raising wagon doors; (2) wrought-iron piping; (3) copper and brass tubes; (4) eye bolts, adjusting screws, etc., and strand wire for fencing; (5) Portland cement, as per specifications to be seen at the Company's Offices. Tenders are to be sent to Mr. C. W. Young, Secretary, Nicholas-lane, London, E.C., marked "Tender for Steel Plates, etc.," or as the case may be, not later than 12 o'clock noon on January 2. For each specification a fee of 1*l.* 1s. is charged, which cannot, under any circumstances, be returned.

JANUARY 2.—**Manchester.**—BRIDGE WORKS.—Manchester Paving, Sewering, and Highways Committee invite tenders for the strengthening of the Ashton Old-road Bridge over the Ashton Canal, and for repairs to Fairfield-street and Sackville-street bridges over the river Medlock. Drawing may be seen, and specification, etc., obtained, on application to the City Surveyor's Office, Town Hall, Manchester, on payment to the City Treasurer of 2*l.* 2s. All cheques or postal orders are to be made payable to the order of "The Corporation of Manchester." Tenders, enclosed in the official envelope, and addressed to the Chairman of the Paving, etc., Committee, to be delivered at the City Surveyor's office, not later than 10 a.m. on January 2.

JANUARY 7.—**Beckenham.**—FENCING.—Beckenham U.D.C. invite tenders for the supply of about 250 lin. yds. of W.I. unclimbable fencing, 6 ft. high, together with ornamental entrance gates. Specifications and forms of tender obtained on application to Mr. John A. Angell, surveyor, on the production of a receipt from the collector for a deposit of 1*l.* Tenders, duly sealed and endorsed "Tenders for Railings and Gates," to reach Mr. F. Stevens, Clerk to the Council, not later than 4 p.m., January 7.

JANUARY 7.—**Caerau.**—MACHINERY.—Llandaff and Dinas Powis R.D.C. invite tenders for disinfector and laundry machinery required at their Infectious Diseases Hospital now in course of erection at Caerau, near Cardiff. Specification and form of tender may be obtained on application to the architect, Mr. John H. James, Albert-chambers, High-street, Cardiff. Tenders, sealed and endorsed, to be sent to Mr. M. Warren, Clerk to the Council, Park House, Cardiff, not later than 10 a.m. on January 7.

JANUARY 7.—**Pendleton, Salford.**—ELECTRIC LIGHT INSTALLATION.—Salford Tramways Committee invite tenders for the complete electric light installation at the Receiving Offices, Mess Rooms, etc., Central Car Depôt, Frederick-road, Pendleton. Form of tender, specification, etc., may be obtained on application to the General Manager, Tramways Department, 32, Blackfriars-street, Salford, upon depositing a cheque, payable to tramways fund, for 1*l.* 1s. Plans may be seen, and further particulars obtained, at 32, Blackfriars-street. Tenders, endorsed "Electric Light Installation, Receiving Offices, etc.," and addressed to the Chairman, Tramways Committee, Town Hall, Salford, must be delivered at office of Mr. L. C. Evans, Town Clerk, Town Hall, Salford, not later than noon on January 7.

JANUARY 7.—**Wandsworth.**—CASTINGS, IRON BARS, ETC.—Wandsworth B.C. invite tenders for the supply of the following materials from March 31 next, viz.:—(1) Castings, etc.; (3) iron bars and other materials for blacksmith work; (4) tools, etc. Forms of tender and specifications may be obtained, and form of contract seen, at offices of Mr. Henry George Hills, Town Clerk, Council House, Wandsworth, S.W., where tenders are to be delivered, sealed and endorsed "Tender for ," on or before January 7.

* JANUARY 10.—**Herts.**—BOILERS.—The Guardians of the Parish of St. Pancras invite tenders for constructing, supplying, delivering, and setting two Lancashire steel boilers to their schools at Leavesden, King's Langley, Herts. Plans, drawings, etc., may be inspected at the Superintendent's Office at the school or at the Town Hall on or after 27th inst. Specifications and form of tender may be obtained from the Clerk, Town Hall, Pancras-road, N.W., to whom tenders, endorsed "Tender for Boilers," must be delivered not later than January 10.

* JANUARY 11.—**Aberystwyth.**—EQUIPMENT OF NEW DAVIES MEMORIAL CHEMICAL LABORATORIES AT ABERYSTWYTH.—Drawing seen, and specifications obtained, of Dr. Sudborough, University College, Aberystwyth, or the architect, Mr. A. W. Cross, 46, New Bond-street, London, W., after December 18. Tenders to be in by January 11.

JANUARY 12.—**East Ham.**—LAUNDRY MACHINERY.—East Ham Corporation invite tenders for the supply, delivery, and fixing of machinery (motor driven), and small boiler, for the laundry block now in course of erection at Roman-road, East Ham. Plans may be seen, and particulars, form of tender, and specification obtained, upon application to the Medical Officer of Health (Dr. G. Sowden, M.D., D.P.H.), at the Town Hall, East Ham, E. Tenders to be delivered addressed to "The Chairman of the Public Health Committee, Town Hall, East Ham, E.," and endorsed "Laundry Machinery," not later than 12 o'clock noon on January 12.

JANUARY 12.—**Eccles.**—ENGINE AND PUMPS.—Eccles Sewage Disposal Committee invite tenders for the supply and erection complete of (1) one two-crank inverted compound condensing engine (inclosed type) and (2) two 10-in. centrifugal pumps, with appurtenant work, required at their Sewage Disposal Works. Drawings may be seen, and specification and bill of quantities with form of tender obtained, from Mr. G. W. Willis, Sewage Works Engineer, Sewage Works, Peel Green-road, Patricroft, on payment of a deposit of 2*l.* 2s. Sealed tenders, endorsed "Tender for Engine, Pumps," and inclosed in the official envelope, to be delivered to Mr. Edwin Parkes, Town Clerk, Town Hall, Eccles, not later than 10 a.m. on January 12.

JANUARY 17.—**Burnley.**—SETTLING TANK.—For the construction of new settling tank, storm-water filter, screening-chamber, storm overflows, and other contingent works connected therewith, for the Burnley R.D.C. Bills of quantities obtained, and plans seen, on application to Mr. S. Edmondson, Engineer to the Council, 18, Nicholas-street, Burnley. Tenders, endorsed "Sabden Sewage Outfall Works Extensions," addressed to Mr. J. S. Horn, Clerk, 18, Nicholas-street, Burnley, to be delivered by January 17.

JANUARY 19.—**Bridlington.**—PUMPING MACHINERY.—For the supply and erection of two sets of deep-well pumping machinery to be driven by steam, suction-gas, or electricity, for the Corporation. Specification, forms of tender, and permits to view the site may be obtained of Mr. A. E. Matthewman, Town Clerk, Town Hall, Bridlington, on payment of 2*l.* Tenders, endorsed "Tender for Pumping Machinery," to be addressed to the Chairman of the Waterworks Committee, and delivered at the Town Clerk's office by January 19.

* JANUARY 22.—**Holloway.**—BRIDGES.—The London C.C. invite tenders for certain works to bridges at Highbury Station and Holloway-road. Full particulars are given in the *London County Council Gazette* of December 17, which can be obtained from Messrs. P. S. King & Sons, 2, Great Smith-street, S.W. Tender, on forms obtainable from the Chief Engineer, County Hall, Spring-gardens, S.W., must be delivered before 10 a.m., January 22.

JANUARY 30.—**Weaste, Salford.**—PUMPS.—Salford Corporation invite tenders for new sewage pumps to two large pumping engines at the Salford Sewage Works, Weaste. Drawings and specifications may be obtained from the Borough Engineer, Town Hall, Salford, on payment of 1*l.* Tenders, endorsed "Sewage Pumps," and addressed to the Chairman of the Rivers Committee, Town Hall, Salford, must be delivered at office of Mr. L. C. Evans, Town Clerk, Town Hall, Salford, not later than 12 noon on January 30.

No DATE.—**Aberdovey.**—VENTILATION.—The Merioneth Education Committee invite tenders for carrying out ventilation work at the Aberdovey Council School. The plans, specification, and further particulars may be obtained on application to the County Architect, Mr. A. M. Howard Jones, Plas Ynys, Borth, R.S.O.

MISCELLANEOUS.

DECEMBER 22.—**Chesterton.**—SCAVENGING.—Chesterton R.D.C. invite tenders for the removal of house refuse from St. John's Ward, Cherryhinton, and Newnham Croft, Grantchester, for twelve months, from Christmas next. Tenders must be sent to Mr. John F. Symonds, Clerk, 9, Benet-street, Cambridge, not later than December 22, and may be for one or both districts.

DECEMBER 24.—**Glanton.**—SCAVENGING.—The R.D.C. of Alnwick invite tenders for cleaning out all the ashpits in the Township of Glanton regularly every six weeks. Sealed tenders, endorsed "Glanton Scavenging," are to be delivered to Mr. H. W. Walton, Clerk, Alnwick, not later than 1.30 p.m. on December 24.

DECEMBER 26.—**Rochdale.**—FIRE CLAY GOODS.—Rochdale Gas Committee invite tenders for the supply of such quantities of firebricks, blocks, tiles, etc., as they may require during a period of twelve months ending December 31, 1907. Forms of tender may be obtained on application to Mr. T. Banbury Ball, the Manager, at the Gasworks. Tenders, endorsed "Fire Clay Goods," must be sent in to Mr. Wm. Henry Hickson, Town Clerk, Town Hall, Rochdale, not later than noon on December 26.

DECEMBER 27.—**Tulse Hill.**—PULLING DOWN.—For pulling down "Ashurst Lodge," Trinity-road, Tulse Hill, S.W., and dividing the building materials into lots ready for an auction sale. Specification, forms of tender and contract may be obtained of Messrs. Stanley Parkes & Brown, auctioneers and surveyors, 816, High-road Tottenham, and all tenders must be received at their offices not later than December 27.

DECEMBER 29.—**Wattstown.**—TIMBER.—For up to 1,000 tons sound larch pitwood (10 in. to 12 in. dia. small end) in 12 ft. lengths, delivered at Wattstown, T.V.R., at the rate of 25 tons per week. Tenders, naming price per ton delivered, to be sent to the United National Collieries, Ltd., Exchange, Cardiff, on or before December 29.

DECEMBER 31.—**Stockton.**—RESEATING.—The Guardians of the Stockton Union invite tenders for the reseating of the board-room. Full particulars and forms of tender to be obtained from Mr. John Rodham, 16, Finkle-street, Stockton-on-Tees. Tenders, duly endorsed "Tender for Reseating," to reach Mr. Fred. Byers Watson, Clerk to the Guardians, Stockton-on-Tees, not later than December 31, at noon.

JANUARY 5.—**West Ham.**—REPAIR OF TOOLS.—West Ham Education Committee invite tenders from firms in the Borough of West Ham for the repair and grinding of tools used in the thirteen woodwork centres under their control for the period ending March 31, 1908. Full particulars and specifications can be obtained on application at the Education Offices, 95, The Grove, Stratford; and sealed tenders must be delivered at the Education Offices on or before January 5.

JANUARY 7.—**Dartford.**—TIMBER.—Dartford Guardians invite tenders for the supply (at per fathom) of about 100 fathoms of best Baltic yellow deal and batten ends for the purpose of splitting for firewood. Tenders are to be delivered at office of Mr. J. C. Hayward, Clerk, Union Offices, Dartford, on or before January 7, at 2 o'clock p.m., endorsed "Tender for Timber."

JANUARY 12.—**Teddington, Hampton, etc.**—SCHOOL FURNITURE.—Middlesex Education Committee invite tenders for the supply of school furniture to the new Council Schools at Teddington, Hampton, and Southall. Plans, specifications, etc., may be obtained from Mr. B. S. Gott, Secretary of the Education Committee, Guildhall, Westminster, S.W. Tenders, in envelopes marked "Tender for Furniture," must be delivered not later than 10 a.m. on or before January 12.

JANUARY 18.—**Bootle.**—PARTITIONS.—Bootle Education Committee invite tenders for supplying and fixing thirty-one sliding and folding partitions in the schoolrooms at the various Council schools in the Borough. Specifications and drawings may be obtained at the office of the Borough Surveyor, Town Hall. Tenders to be sent to the Town Clerk not later than 10 a.m. on January 18, endorsed "Tender for Partitions."

PAINTING, etc.

JANUARY 2.—**Duffryn Mawr.**—PAINTING.—Llandaff and Dinas Powis R.D.C. invite tenders for repainting the iron bridge across the River Ely, near Duffryn Mawr, Pendoylan. Specification can be seen at the office of the surveyor, Mr. James Holden, A.M.Inst.C.E., 20, Park-place, Cardiff. Tenders to be sent to Mr. M. Warren, Clerk to the Council, Park House, Cardiff, not later than 12 o'clock noon on January 2.

ROADS, SANITARY, AND WATER WORKS.

DECEMBER 24.—**Burgess Hill.**—ROAD WORKS.—Burgess Hill U.D.C. invite tenders for the construction and making good of part (about 45 yds. in length) of the private street within their district known as Slimbridge-road and works in connexion therewith. Plans and specification may be seen, and form of tender obtained at the office of the Council, at Church-road, Burgess Hill. Tenders, sealed and endorsed "Slimbridge-road," to be delivered to the Clerk to the Council not later than December 24.

DECEMBER 24.—**Ely, Cardiff.**—STREET IMPROVEMENT WORKS.—Llandaff and Dinas Powis R.D.C. invite tenders for private street improvement works in Brook-lane, Ely, in accordance with specification, which may be seen, and bills of quantities obtained, on application to the surveyor, Mr. James Holden, A.M.Inst.C.E., Park House, 20, Park-place, Cardiff. Tenders, sealed and endorsed, to be sent to Mr. M. Warren, Clerk, Park House, Cardiff, not later than 12 o'clock noon on December 24.

DECEMBER 25.—**Oldham.**—STREET WORKS.—Oldham Surveyors Committee invite tenders for the sewering,

paving, flagging, and completing of Limeside-road (parts of), Frederick-street (part of), Martha-street, Norman-street, and Davies-street. Plans and specifications can be seen, and quantities and forms of tender obtained, at the office of the Borough Surveyor. Sealed tenders, endorsed "Tenders for Street Works," and addressed to the Chairman of the Surveyors Committee, to be returned not later than December 26.

DECEMBER 27.—**Burslem.**—STREET WORKS.—Burslem Corporation invite tenders for the making-up of back Tellwright-street. Plan and specification can be seen, and quantities obtained, at the Borough Surveyor's Office, Queen-street, on payment of 2*l.* 2*s.* Sealed tenders, endorsed "Private Streets," to be sent to Mr. A. Ellis, Town Clerk, Town Hall, Burslem, not later than 10 a.m. on December 27.

DECEMBER 27.—**Gunthorpe.**—SEWER.—The Southwell R.D.C. invite tenders for 333 yds. of 6-in. sewer in the Parish of Gunthorpe. Specifications and particulars may be obtained from Mr. Walter Cottam, surveyor, Southwell. Tenders to be sent to Mr. G. E. Kirkland, Clerk to the Council, Southwell, on or before December 27.

DECEMBER 27.—**Leeds.**—PRIVATE STREET WORKS.—Leeds Highways Committee invite tenders for the paving and flagging of the following streets:—Lucas-place, back Lucas-street, back Hartley-grove. Drawings may be seen at the City Engineer's office, Municipal Buildings. Forms of tender and bills of quantities may be obtained, and copies of the documents forming the contract inspected, on application at the Highways Office, 155, Kirkstall-road. Sealed tenders, endorsed "Tender for Private Street Works," and addressed to the Highways Committee, must be delivered at the Town Clerk's Office, Town Hall, Leeds, not later than 10 a.m. on December 27.

DECEMBER 27.—**Winchester.**—SEWERS.—The Corporation invite tenders for the purpose of laying four lengths of sewers. Drawings, specifications, and form of agreement can be seen on application to, and bills of quantities and form of tender obtained from, the City Surveyor, at the Guildhall, on payment of 2*l.* 2*s.* Tenders, enclosed in sealed envelopes, endorsed "Tender for Sewers," to be delivered to Mr. Thomas Holt, Town Clerk, Guildhall, Winchester, at or before 9 a.m. on December 27.

DECEMBER 29-JANUARY 3.—**Banchory.**—ROAD WORKS.—Banchory T.C. invite tenders for the macadamising, etc., of 859 lin. yds. or thereby of streets within the Burgh, including channels, kerbing, gullies, footways, and crossings thereon. The Burgh Road Surveyor will meet intending offerers at Viewmount-road (west end), on December 29, at 1.30 p.m., to point out the works. Specifications may be seen at the office of Mr. J. Merson, Town Clerk, High-street, Banchory, where tenders should be lodged not later than January 3.

DECEMBER 29.—**Brentwood.**—ROAD WORKS.—Brentwood U.D.C. invite tenders for the making-up of North road-avenue, Brentwood, according to the plans and specification to be seen upon appointment with Mr. A. J. Meeson, Surveyor, Town Hall, Brentwood. Tenders to be sent to Mr. C. Edgar Lewis, Clerk, Brentwood, securely sealed, marked "Tender, North Road-avenue," by December 29.

DECEMBER 31.—**St. Albans.**—ROAD WORKS.—For the draining, lowelling, paving, metalling, kerbing, channelling, and making good Sandfield-road, St. Peter Rural, Herts, for St. Albans R.D.C. Plans, etc., may be inspected, and the bills of quantities, with forms of tender, obtained from Mr. Henry F. Mence, Town Hall-chambers, St. Albans, on payment of 2*l.* 2*s.* Sealed tenders to be delivered at the offices of the Council, 8, St. Peters's-street, St. Albans before 12 noon on December 31.

DECEMBER 31.—**Surbiton.**—DRAINAGE.—The U.D.C. of Surbiton invite tenders for drainage works under 25*l.* in value. Names to Mr. James Bell, Clerk to the Council, on or before December 31.

JANUARY 3.—**Luton.**—PAVING.—Luton Town Council invite tenders for paving and doing other works of private improvement in Clarendon-road and Ridgeway-road, in accordance with the plans and specifications prepared by the Borough Surveyor, and to be seen at his office at the Town Hall, Luton. Separate tenders for each street to be received by Mr. Geo. Sell, Town Clerk, Town Hall, Luton, by 4 o'clock p.m. on January 3.

JANUARY 3.—**Mountain Ash.**—SEWER WORKS.—Aberdare U.D.C. invite tenders for the laying of about 600 lin. yards of 27-in. cast-iron sewer, and the lifting and relaying of about 470 lin. yds. of 27-in. cast-iron sewer, and the lifting and relaying of about 230 timber tubing, with all necessary manholes, sluices, etc., at Cwm Cynon, Mountain Ash. Plans, sections, and specification may be inspected at the Surveyor's Office, Town Hall, between the hours of 10 a.m. and 5 p.m. Sealed tenders, endorsed "Outfall Sewer," must be delivered to Mr. Thos. Phillips, Town Hall, Aberdare, on or before January 3.

JANUARY 5.—**Horwich.**—SEWERS.—Horwich U.D.C. invite tenders for the construction of about 5,000 yds. of stoneware and iron pipe sewers, 12 in. and 9 in. in diameter respectively, together with the necessary lampholes, manholes, etc. Plans, sections, and specification may be seen on application to the Surveyor at the Council Offices, Horwich, who will furnish bill of quantities and form of tender, on payment of a deposit of 2*l.* Sealed tenders, endorsed "Main Sewers," to be delivered to Mr. Peter Taberner, Clerk to the Council, Council Offices, Horwich, not later than January 5.

JANUARY 7.—**Erith.**—PRIVATE STREET WORKS.—The U.D.C. of Erith invite tenders for private street works in Alexander-road, Erith. Plans and specification may be seen and form of tender, estimate of quantities, and further particulars obtained, at the office of the Surveyor of the Council, Bexley-road, Erith, upon payment of 1*l.* Tenders, endorsed "Private Street Works Tender," must be received by Mr. Charles H. Fry, Clerk of the Council, District Council Offices, Erith, Kent, not later than 4 p.m. on January 7.

JANUARY 7.—**Newtown, Mountain Ash.**—SEWER.—Mountain Ash U.D.C. invite tenders for the hauling, laying, and jointing of about 225 yds. of 15-in. cast-iron sewer pipes near Newtown, Mountain Ash. Plans, sections, and specification may be seen, and form of tender and bill of quantities obtained, on application to Mr. W. G. Thomas, Surveyor, Town Hall, Mountain Ash. Sealed tenders, prepaid and endorsed "Newtown Sewer," to be sent to Mr. M. P. Linton, Clerk to the Council, Town Hall, Mountain Ash, so that they be received not later than 9 a.m. on January 7.

* JANUARY 14.—**Romford.**—SANITARY ANNEXES.—The Romford Guardians invite tenders for erection of four sanitary annexes at the Workhouse, in accordance with plans and specifications by the architect, Mr. James Kennedy, 25, Bedford-row, W.C., from whom bills of quantities and forms of tender may be obtained before December 29. Sealed tenders, endorsed "Tender for Sanitary Annexes," to be sent to the Clerk, 13, Morth-street, Romford, on or before 4 p.m., January 14.

JANUARY 17.—**Burnley.**—ROAD WORKS.—For kerbing, flagging, paving, and making-up of a number of streets in the village of Hapton, for the Burnley R.D.C. Drawings and specifications may be seen, and form of tender, etc., obtained, from Mr. S. Edmondson, surveyor, 18, Nicholas-street, Burnley. Sealed tenders, endorsed "Private Street Works, Hapton," to be delivered at the office of Mr. J. S. Horn, Clerk, 18, Nicholas-street, Burnley, by January 17.

JANUARY 19.—**Bexley.**—SEWER.—Bexley U.D.C. invite tenders for providing and laying about 2,079 lin. yds. of 9-in. and 309 lin. yds. of 6-in. best glazed stoneware pipe sewers, with manholes complete, in the Oaklands and Broadway Estates in the Christchurch part. Plans and specification may be seen, and bills of quantities and form of tender, obtained, on application to Mr. W. T. Howse, Surveyor to the Council, at the Council Offices, Bexley Heath, on payment or deposit of a cheque for 2*l.* 2*s.* Sealed tenders, endorsed "Christchurch Part Sewers, Oaklands and Broadway Estates," to be delivered to Mr. Thos. G. Baynes, Clerk to the Council, Council Offices, Bexley Heath, Kent, not later than January 19.

JANUARY 22.—**Sowerby Bridge.**—BACTERIA BEDS.—The Sowerby Bridge U.D.C. invite tenders for the undermentioned works at the Sewage Works, Milner Royd, Sowerby Bridge, viz.:—The supply, delivery, and filling the remaining twelve bacteria beds with filtering medium; quantity, about 9,000 cubic yds. Conditions and samples of filtering medium, etc., may be seen at the engineer's office, Hollings Mill-lane, Sowerby Bridge. Specification and quantities may be obtained on application to the engineer, Mr. C. L. Whitehead, C.E., M.E., Sowerby Bridge, on payment of a 5*l.* Bank of England note only. Tenders, endorsed "Bacteria Beds," and addressed and delivered to Mr. R. W. Evans, Clerk and Solicitor to the Council, Commercial Bank-chambers, Halifax, in sealed envelopes, not later than January 22.

No DATE.—**Caldy.**—ROAD.—For the construction of a road at Caldy, near West Kirby, Cheshire. For particulars apply to Mr. D. B. Rappart, Merebank-promenade, Liscard, Cheshire.

No DATE.—**Cookridge.**—DRAINAGE.—For draining 3 ft. deep a six-acre field (work only) at Lane End Farm, Cookridge. Apply Mr. Wm. Murgatroyd, Yeadon.

No DATE.—**Shepley.**—BOWLING GREEN.—The excavators and drainers' work required in laying a bowling green (turf excepted) at Shepley. Plans and particulars to be seen at Holly Park, Shepley. Mr. J. T. Chambers, surveyor.

STONE, MATERIALS, AND STORES.

DECEMBER 28.—**Rochdale.**—STORES.—Rochdale Canal Company invite tenders for the supply of stores for the year 1907 as follows, viz.:—Bolts and nuts (various); brushes (various); canvas; engine packing; ironmongery; oils and paints; ropes (various). Samples can be seen, and approximate quantities ascertained, on application at the Company's Stores, 80, Dale-street, Manchester, on December 18 and 19, and tenders (endorsed) must be forwarded so as to reach Mr. C. R. Dykes, Secretary, Manchester, not later than 10 a.m. on December 28.

DECEMBER 29.—**Barry.**—MATERIALS.—Barry U.D.C. invite tenders for the supply and delivery of the following goods, up to May 31, 1907:—Lead and compo pipe, pig and sheet lead, block tin, etc. Further particulars and forms of tender may be obtained from the Gas and Water Engineers, Gasworks, Barry. Sealed tenders, endorsed "Lead and Compo Pipe," "Pig and Sheet Lead," or "Block Tin," as the case may be, to be sent to Mr. T. B. Tordoff, Clerk, Council Offices, Barry, not later than 12 o'clock noon on December 29.

DECEMBER 29.—**Bury.**—MATERIALS.—Bury Tramways Committee invite tenders for the supply and delivery of the following materials:—Tramway rails and fishplates; tie-bars, fish bolts, and nuts; points and crossings; sole or anchor plates; copper rail bonds; granite setts; cement. Specifications and bills of quantities, with forms of tender, can be obtained on application at the office of Mr. Arthur W. Bradley, A.M.Inst.C.E., Borough Engineer and Surveyor, on payment of 2*l.* for each specification. Sealed tenders, endorsed "Tramway Rails, etc.," or as the case may be, are to be forwarded to Mr. John Haslam, Town Clerk, Municipal Offices, Bank-street, Bury, and addressed to the Chairman of the Tramways Committee, so as to be received not later than December 29.

JANUARY 1.—**London.**—STORES.—Bombay, Baroda, and Central India Railway Directors invite, up to noon on January 1, tenders for the supply of the following stores, viz.:—(1) Accumulator cells, etc.; (2) bunting, canvas, etc.; (3) eye bolts and strand wire, for fencing. Tenders must be made on forms, copies of which, with specifications, can be obtained at offices of Mr. W. V. Constable, Secretary, Gloucester House, 2, 3, and 4, Bishopsgate-street Without, London, E.C., on payment of 21*s.* each (which will not be returned).

JANUARY 1.—**Norwich.**—BRICKS.—160,000 red bricks, equal in all respects to the sample which may be seen at office of Mr. Arthur E. Collins, M.Inst.C.E., City Engineer, Guildhall, Norwich, delivered as, when, and in such quantities as are required, alongside the sewage works in progress between Old Lakenham and Hall-road, Norwich. Tenders, on the forms supplied, enclosed in envelopes sealed with sealing-wax, endorsed "Bricks," and addressed to the Chairman of the Sewerage Committee, must be delivered at office of Engineer not later than 10 a.m. on January 1.

JANUARY 21.—**Camberwell.**—ANNUAL CONTRACTS.—Camberwell B.C. invite tenders for the undermentioned work, or for the supply of the undermentioned stores, materials, etc., the contracts to commence April 1, 1907, and terminate March 31, 1908:—(*a*) Timber for carts, vans, etc.; (*c*) white lead, painters' and oilman's sundries, glass, cart grease, oils, soaps, candles, etc., tar, pitch, creosote, bitumen, leather belting, various packings, and sundries; (*d*) brooms, brushes, and combs; (*e*) shovels, pickaxes, files, pails, screws, nails, bolts, shoeing, hoop, bar, and round iron and steel, coach and builders' general ironmongery, wrought-iron tubes, cast-iron pipes, lead sheet, and pipe, etc.; (*h*) maintenance of private telephones and electric bells; (*j*) flints, ragstone, hoggin, hardcore, Thames and crushed ballast, broken granite, granite kerb, channel and pitchings, York stone, tar paving materials, lime and cement, bricks, slates, and miscellaneous building materials; (*k*) asphalt and tar paving works; (*n*) stoneware drain pipes, etc., and sewer ironwork; (*o*) disinfectants, etc.; (*s*) incandescent electric lamps, incandescent and other gas fittings. Forms of tender may be obtained from Mr. William Oxtoby, Borough Engineer, Town Hall, Camberwell, S.E., specifying sections desired. Samples may be inspected at Grove Vale Depot, opposite East Dulwich Station. No tender will be considered except on the authorised form of tender, which must be delivered at the Town Hall not later than 5.30 p.m. on January 21.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*CLERK OF WORKS	Romford Guardians	3*l.* 3*s.* per week	Dec. 31
*ASSISTANT MASTERSHIP (EVENING SCHOOL)	Architectural Association	3*l.* 3*s.* per week	Jan. 3

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*TIMBER, 103, LAVENDER-HILL, BATTERSEA—On the Premises	Joseph Hibbard & Sons	Jan. 7, 8, & 9
*BUILDING SITE, MILE END, E.—At the Mart	Daniel Watney & Sons	Jan. 10

PATENTS.—*Continued from page* 735.

comprising a regularly-formed central body provided with external projecting ribs of uniform cross-section symmetrically and regularly disposed about the central body at an angle to its longitudinal axis, so that the whole bar has a constant cross-section throughout its length, and under conditions of stress as a substantially uniform elongation.

11,518 of 1906.—I. DAVEY: *Means for Holding Windows Open for Ventilation and to Prevent Rattling of the same.*

This relates to a sash-fastener, and consists of a metal plate fixed to the styles of the upper sash, and a screw or bolt applied to a nut or barrel on the lower sash in such a manner that the said screw or bolt can, on being brought level with the threaded holes in the metal plate, be rotated until the sashes are drawn against the parting bead, thus preventing the rattling of the sashes whether close or open for ventilation.

19,127 of 1906.—G. E. HUMPHRIES: *Scaffolding Brackets.*

This relates to a scaffolding bracket comprising horizontal vertical and diagonal members, the horizontal member having an integrally-formed hook of rectangular section at its inner end adapted to fit a similarly shaped slot in the fastening contrivance.

25,301 of 1905.—G. H. GASCOIGNE: *Wireproof Flooring.*

This relates to a fireproof flooring, and consists in the combination with ferro-concrete joists or beams provided at intervals in the member or compression part with transverse openings of grooves, or the like, of concrete arched-shaped centring adapted to be placed on the joists or beams when in position, and a concrete floor filling laid over the joists and centring and firmly binding the whole together.

4,971 of 1906.—A. A. R. LANG: *Erection of Building and the Construction of Building Blocks therefor.*

This relates to concrete building blocks formed in two or more parts connected by tie-rods and having spaces between the parts; the blocks are also formed by moulding in a mould box.

5,918 of 1906.—T. WINSTANLEY: *Concrete-mixing Machinery.*

This relates to a concrete-mixing machine, and consists in the combination of a cylindrical rotating barrel, with a rack on one end, and inwardly coned ends mounted and revolving upon a fixed hollow shaft supported and fixed at each in fixed clamp-bearings on the upper ends of frames, one end of said hollow shaft having connected with it the detachable water-measuring tank.

TERMS OF SUBSCRIPTION.

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SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

December 10.—By MORGAN, BAINES & CLARK.

Carshalton, Surrey.—Park-la., The Carshalton-pk. Gates, also the building land on which the gates stand, f., p. £1,900

December 11.—By ARTHUR BARTON.

Walworth.—19, 20, and 21, Sedan-st., u.t. 43¼ yrs., g.r. 12*l.*, w.r. 105*l.* 6s. 620

Welling, Kent.—9 to 23 (odd), Bethel-rd., u.t. 95 yrs., g.r. 25*l.* 12s., w.r. 156*l.* (including mortgage). 1,232

By C. W. DAVIES & SON.

City Road.—89, City Garden Row, u.t. 22 yrs., g.r. 5*l.*, e.r. 36*l.* 155

Islington.—16 and 18, Frome-st., u.t. 41 yrs., g.r. 14*l.*, y.r. 60*l.* 380

By R. A. ENRIGHT.

Ilford.—42, Argyle-rd., u.t. 99 yrs, g.r. 9*l.* 18s. e.r. 52*l.* 550

88, Wanstead Park-rd., u.t. 92 yrs., g.r. 4*l.* 17s. 6d., e.r. 26*l.* 240

Stoke Newington.—24, King's-rd., u.t. 60 yrs., g.r. 9*l.*, e.r. 55*l.* 500

By WESTON & SONS.

Hackney-road.—No. 195 (s.), f., e.r. 50*l.* 560

Brixton.—148, Ferndale-rd., u.t. 44 yrs., g.r. 6*l.*, w.r. 44*l.* 4s. 185

By DYER, SON, & HILTON (on premises).

Blackheath.—73, Eltham-rd., with stabling, u.t. 53 yrs., g.r. 20*l.*, p. 950

By G. LOVEITT & SONS (at Coventry).

Coventry, Warwick.—King William-st., "The New Inn" and tenement adjoining, area 537 yds., f. 4,000

Much Park-st., "The Greyhound Inn," y.r. 26*l.* 1s., and two tenements, f., w.r. 26*l.* 3s. 1,750

142, 143, and 144, Much Park-st. (s.), f., y.r. 44*l.* 1,005

21 and 22, Park side, f., y.r. 21*l.* 10s. 305

By MADDISON, MILES, & MADDISON (at Yarmouth).

Gorleston, Suffolk.—106, Beccles-rd., f., y.r. 10*l.* 18s. £115

Yarmouth, Norfolk.—36, Victoria-rd., f., y.r. 27*l.* 510

By M. DE ROME & SON (at Kendal).

Whinfell, Westmorland.—"Ashstead Farm," 551a. 2r. 18p., f. 3,510

December 12.—By D. BURNETT & CO.

Tottenham.—High-rd., f.g. rents 24*l.*, reversion in 72 yrs. 550

Ferndale-rd., f.g. rents 42*l.*, reversion in 90 and 92 yrs. 920

Gladesmore-rd., f.g. rents 30*l.*, reversion in 92 yrs. 660

Gladesmore-rd., f.g. rents 14*l.*, reversion in 93 yrs. 320

Stratford.—31 to 37 (odd), West Ham-la., f., w.r. 94*l.* 18s. 980

By JAMES & CO.

Kensal Rise.—117, Chamberlayne Wood-rd. (s.), u.t. 95¼ yrs., g.r. 14*l.*, e.r. 100*l.* 1,000

Southall, Middx.—54 to 64 (even), West End-rd., f., w.r. 140*l.* 8s. 1,620

By ROGERS, CHAPMAN, & THOMAS.

South Kensington.—4 and 6, Caspar-mews (stabling), u.t. 64½ yrs., g.r. 12*l.*, y.r. 100*l.* 300

By R. TIDEY & SON.

De Beauvoir Town.—83 and 105, Downham-rd., u.t. 12¼ yrs., g.r. 7*l.* 10s., y.r. 84*l.* 345

By G. TROLLOPE & SONS.

Piccadilly.—10, Stratton-st., f., p.; also 13 and 15, Market-mews (stabling), u.t. 4¼ yrs., y.r. 130*l.* 16,000

By DOUGLAS YOUNG & CO.

Camberwell.—99, 101, and 103, Denmark Hill, u.t. 26 yrs., g.r. 133*l.* 9s., y.r. 410*l.* 1,000

Plaistow.—Denmark-st., f.g. rents 11*l.* 15s., u.t. 777 yrs., g.r. nil, with reversion 200

By TOMKINS, TAYLOR, & OLIVER (at Charlwood).

Charlwood, Surrey.—Rectory La., "Lunn's Cottage" and building land adjoining, f., y.r. 12*l.* 453

Rectory-la., freehold cottage and garden, y.r. 9*l.* 150

By C. R. MORRIS, SONS, & PEARD (at Wincanton).

Maperton, Somerset.—"Cupola Farm," 53a. 1 r. 0 p., f. 2,065

"Titwell" and "Wheat" Closes, 11 a. 0 r. 36 p., f. 385

Holton, Somerset.—Freehold enclosures, 10 a. 1 r. 12 p. 321

Charlton Musgrove, Somerset.—"Hook Farm," 220 a. 1 r. 23 p., f. 6,010

December 13.—By GLASIER & SONS.

Strand.—Wellington-st., the Lyceum Theatre, also 33, 34, 35, 36, and 37, Exeter-st. (s.), area 23,500 ft., f. 119,500

By BISLEY & SONS.

Bermondsey.—12 to 18, Eldridge-rd., u.t. 28¼ yrs., g.r. 30*l.* 12s 6d., w.r 245*l.* 14s. 1,200

Lewisham.—78, Marsala-rd., u.t. 76 yrs., g.r. 4*l.*, e.r. 42*l.* 335

Rotherhithe.—90, Lower-rd., u.t. 40½ yrs., g.r. 13*l.* 11s., y.r. 40*l.* 320

Kennington.—26, Kempsford-rd., u.t. 26¾ yrs., g.r. 4*l.*, increasing to 6*l.*, y.r. 30*l.* 255

By HAMPTON & SONS.

Notting Hill.—1a, Holland-pk., area over ¾ of an acre, f., p. 5,760

By MAY & ROWDEN.

Shaftesbury Avenue.—40, Great Windmill-st., (s), f., y.r. 85*l.* 1,950

By C. C. & T. MOORE.

Clapton.—Nightingale-rd., f.g.r. 12*l.*, reversion in 64 yrs. 300

Canning Town.—37, Victoria Dock-rd., f., y.r. 30*l.* 275

Hackney.—204, Amherst-rd., u.t. 41 yrs., g.r. 8*l.* 8s., 8d., p. 385

Walthamstow.—Chelmsford-rd., f.g.r. 33*l.*, reversion in 93 yrs. 726

Boston-rd., f.g.r. 10*l.*, reversion in 78 yrs. 225

By NEWBON, SHEPHARD, & EDWARDS.

Islington.—54 to 64 (even), Windsor-st., c., w.r. 187*l.* 4s. 1,350

43, and 47, Gibson-sq., f., e.r. 105*l.* 1,320

25, Gibson-sq., u.t. 20½ yrs., g.r. 9*l.*, y.r. 50*l.* 230

Canonbury.—21, 23, and 25, Spencer-st., u.t. 12 yrs., g.r. 18*l.*, y.r. 133*l.* 10s. 340

46 and 66, Halton-rd., u.t. 11¼ yrs., g.r. 14*l.* 10s., y.r. 90*l.* 175

Holloway.—33, Hillmarten-rd., u.t. 60¼ yrs., g.r. 11*l.*, e.r. 65*l.* 530

By STIMSON & SONS.

Battersea.—16 and 17, Rowena-cres., u.t. 70½ yrs., g.r. 10*l.*, w.r. 67*l.* 12s. 510

Caledonian-road.—45, Pembroke-st., u.t. 43 yrs., g.r. 4*l.* 4s., y.r. 28*l.* 245

Islington.—52 and 54, Shepperton-rd., u.t. 2½ yrs., g.r. 11*l.*, y.r. 66*l.* 250

Forest Hill.—124, 126, and 128, Devonshire-rd. ("Belle Vue Mansions"), u.t. 97 yrs., g.r. 110*l.*, e.r. 855*l.* 18s. 1,400

Kingsland.—92 to 98 (even), Haggerston-rd., u.t. 32 yrs., g.r. 8*l.*, e.r. 208*l.* 710

42 and 44, Middleton-rd., u.t. 32½ yrs., g.r. 10*l.*, y.r. 68*l.* 470

Wandsworth.—44 and 46, Birdhurst-rd., u.t. 76 yrs., g.r. 10*l.*, w.r. 62*l.* 8s. 500

Walworth.—37A to 37D, Aylesbury-st., u.t. 41½ yrs., gr. 22*l.*, w.r. 152*l.* 2s. 770

33 and 35, Runham-st., u.t. 52½ yrs., g.r. 10*l.*, w.r. 72*l.* 16s. 400

Bermondsey.—38 to 41, Kinross-st., u.t. 8½ yrs., g.r. 12*l.*, w.r. 109*l.* 4s. 170

13, 14, and 15, Weston-pl., u.t. 7½ yrs., g.r. 3*l.*, w.r. 85*l.* 16s. 140

Southwark.—13, 14, and 15, Bath-st., u.t. 33½ yrs., g.r. 13*l.* 10s., w.r. 101*l.* 8s. 415

Streatham.—83, Gleneagle-rd., u.t. 75 yrs., g.r. 14*l.* 5s., e.r. 60*l.* 410

Anerley.—206, Anerley-rd., area ¼ of an acre, u.t. 41½ yrs., g.r. 21*l.* 11s., e.r. 80*l.* 450

By WORSFOLD & HAYWARD (at Dover).

Dover, Kent.—Blucher-row, freehold house and stable, p. £185

36 and 36A, Snargate-st. (s.), u.t. 63½ yrs., g.r. 6*l.*, y.r. 60*l.* 640

Northampton-st., the Harbour Dining Rooms, u.t. 63½ yrs., g.r. 2*l.* 10s., y.r. 25*l.* 250

34 and 36, Tower Hamlets-st., f. 240

37, Tower Hamlets-st., with stable and smithy (including engine and machinery), f., p. 315

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold, p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. beerhouse; p h. for public-house; o. for office; s. for shops; ct. for court.

MEETINGS.

THURSDAY, DECEMBER 27.

Royal Institution (Christmas Lectures).—Mr. W. Duddell, M.I.E.E., on "Signalling to a Distance, from Primitive Man to Radiotelegraphy," I. 3 p.m.

SATURDAY, DECEMBER 29.

Royal Institution (Christmas Lectures).—Mr. W. Duddell on "Signalling to a Distance, from Primitive Man to Radiotelegraphy," II. 3 p.m.

TO CORRESPONDENTS.

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.			
Hard Stocks	1	10	0	per 1000 alongside, in river.		
Rough Stocks and Grizzles	1	7	0	,,	,,	,,
Picked Stocks for Facings	2	17	6	,,	delivered.	
Flettons	1	8	0	,,	at railway depôt.	
Red Wire Cuts	1	14	0	,,	,,	,,
Best Fareham Red	3	12	0	,,	,,	,,
Best Red Pressed Ruabon Facing	5	0	0	,,	,,	,,
Best Blue Pressed Staffordshire	3	15	0	,,	,,	,,
Do. Bullnose	4	0	0	,,	,,	,,
Best Stourbridge Fire Bricks	3	14	0	,,	,,	,,
GLAZED BRICKS.						
Best White and Ivory Glazed Stretchers	12	0	0	,,	,,	,,
Headers	11	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	16	0	0	,,	,,	,,
Double Stretchers	19	0	0	,,	,,	
Double Headers	16	0	0	,,	,,	,,
One Side and two Ends	19	0	0	,,	,,	,,
Two Sides and one End	20	0	0	,,	,,	,,
Splays, Chamferred, Squints	20	0	0	,,	,,	,,
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	14	0	0	,,	,,	,,
Double Stretchers	15	0	0	,,	,,	,,
Double Headers	14	0	0	,,	,,	,,
One Side and two Ends	15	0	0	,,	,,	,,
Two Sides and one End	15	0	0	,,	,,	,,
Splays, Chamferred, Squints	14	0	0	,,	,,	,,
Second Quality White and Dipped Salt Glazed	2		0	,,	less than best.	

BRICKS, &c. (continued).

GLAZED BRICKS (continued)—

Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	5 6	„ „
Best Portland Cement	17 0	per ton, „
Best Ground Blue Lias Lime	19 0	„ „

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks	27s. 0d. per ton at rly. dpt.

STONE.

BATH STONE—delivered on road waggons, Paddington Depôt	1	6½ per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1	8½ „ „
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	1 „ „
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	2½ „ „

Ancaster in blocks	1 10	per ft. cube, deld. rly. depôt.
Beer „	1 6	„ „
Greenshill „	1 10	„ „
Darley Dale in blocks	2 4	„ „
Red Corsehill „	2 2	„ „
Closeburn Red Freestone	2 0	„ „
Red Mansfield „	2 4	„ „

YORK STONE—*Robin Hood Quality.*

Scappled random blocks	2 10	„ „
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3 per ft. super., „
6 in. rubbed two sides ditto, ditto	2	6 „ „
3 in. sawn two sides slabs (random sizes)	0	11½ „ „
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7½ „ „
1½ in. to 2 in. ditto, ditto	0	6 „ „

HARD YORK—

Scappled random blocks	3	0 per ft. cube, „
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	8 per ft. super., „
6 in. rubbed two sides ditto	3	0 „ „
3 in. sawn two sides slabs (random sizes)	1	2 „ „
2 in. self-faced random flags	0	5 „ „

Hopton Wood (Hard Bed) in blocks	2 0	per ft. cube, deld. rly. depôt.
„ „ „ 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt.
„ „ „ 3 in. sawn both sides random slabs	1 0	„ „
„ „ „ 2 in. do.	0 8½	„ „

SLATES.

In. In.	£ s. d.	
20×10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20×12 „ „	13 17 6	„ „
20×10 first quality „	13 0 0	„ „
20×12 „ „	13 15 0	„ „
16×8 „ „	7 5 0	„ „
20×10 best blue Portmadoc	12 12 6	„ „
16×8 „ „	6 12 6	„ „
20×10 best Eureka unfading green	15 17 6	„ „
20×12 „ „	18 7 6	„ „
18×10 „ „	13 5 0	„ „
16×8 „ „	10 5 0	„ „
20×10 permanent green	11 12 6	„ „
18×10 „ „	9 12 6	„ „
16×8 „ „	6 12 6	„ „

TILES.

	s. d.	
Best plain red roofing tiles	42	0 per 1000 at rly. depôt.
Hip and Valley tiles	3	7 per doz. „
Best Broseley tiles	50	0 per 1000 „
Do. Ornamental tiles	52	6 „ „
Hip and Valley tiles	4	0 per doz. „
Best Ruabon red, brown, or brindled do. (Edwards)	57	6 „ „
Do. Ornamental do.	60	0 „ „
Hip tiles	4	0 per doz. „
Valley tiles	3	0 „ „
Best Red or Mottled Staffordshire do. (Peakes)	51	9 per 1000 „
Do. Ornamental do.	54	6 „ „
Hip tiles	4	1 per doz. „
Valley tiles	3	8 „ „
Best "Rosemary" brand plain tiles	48	0 per 1000 „
Best Ornamental tiles	50	0 „ „
Hip tiles	4	0 per doz. „
Valley tiles	3	8 „ „
Best "Hartshill" brand plain tiles, sand-faced	50	0 per 1000 „
Do. pressed	47	6 „ „
Do. Ornamental do.	50	0 „ „
Hip tiles	4	0 per doz. „
Valley tiles	3	6 „ „

WOOD.

BUILDING WOOD.	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10 0	... 15 0 0
Deals: best 3 by 9	13 0 0	... 14 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 0 0	... 12 0 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best.
Battens: seconds	0 10 0	„ „
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	... 10 0 0
2 in. by 4½ in. and 2 in. by 5 in.	8 10 0	... 9 10 0
Foreign Sawn Boards— 1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.
1 in.	1 0 0	„

WOOD (continued).

BUILDING WOOD (continued)—	At per load of 50 ft. £ s. d.	£ s. d.
Fir timber: best middling Danzig or Memel (average specification)	4 10 0	... 5 0 0
Seconds	4 0 0	... 4 10 0
Small timber (8 in. to 10 in.)	3 12 6	... 3 15 0
Small timber (6 in. to 8 in.)	3 0 0	... 3 10 0
Swedish balks	2 10 0	... 3 0 0
Pitch-pine timber (50 ft. average)	4 0 0	... 4 15 0

JOINERS' WOOD.	At per standard.	
White Sea: first yellow deals, 3 in. by 11 in.	24 0 0	... 25 0 0
3 in. by 9 in.	22 0 0	.. 23 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	... 18 0 0
Second yellow deals, 3 in. by 1 in.	18 10 0	... 20 0 0
„ „ 3 in. by 9 in.	17 10 0	... 19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	... 14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	13 10 0	... 15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 0 0	... 12 0 0
Petersburg first yellow deals, 3 in. by 11 in.	21 0 0	... 22 10 0
Do. 3 in. by 9 in.	18 0 0	... 19 10 0
Battens	13 10 0	... 15 0 0
Second yellow deals, 3in. by 11in.	16 0 0	... 17 0 0
Do. 3 in. by 9 in.	14 10 0	... 16 0 0
Battens	11 0 0	... 12 10 0
Third yellow deals, 3 in. by 11 in.	13 0 0	... 14 0 0
Do. 3 in. by 9 in.	12 10 0	... 14 0 0
Battens	10 0 0	... 11 0 0
White Sea and Petersburg— First white deals, 3 in. by 11 in.	14 10 0	... 15 10 0
„ „ 3 in. by 9 in.	13 10 0	... 14 10 0
Battens	11 0 0	... 12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	... 14 10 0
„ „ 3 in. by 9 in.	12 10 0	... 13 10 0
„ „ battens	10 0 0	... 11 0 0
Pitch-pine: deals	18 0 0	... 21 0 0
Under 2 in. thick extra	0 16 0	... 1 0 0
Yellow Pine—First, regular sizes	44 0 0	upwards.
Oddments	32 0 0	„
Seconds, regular sizes	33 0 0	„
Yellow Pine oddments	28 0 0	„
Kauri Pine—Planks, per ft. cube	0 3 6	... 0 5 0
Danzig and Stettin Oak Logs— Large, per ft. cube	0 3 0	... 0 3 6
Small „ „	0 2 6	... 0 2 9
Wainscot Oak Logs, per ft. cube	0 5 6	... 0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8½	... 0 0 9½
¾ in. do. do	0 0 7	... —
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	... 0 1 0
Selected, Figury, per ft. super. as inch	0 1 6	... 0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	... 0 1 0
Teak, per load	17 0 0	... 22 0 0
American Whitewood Planks, per ft. cube	0 4 0	... 0 5 0

Prepared Flooring, etc.—	Per square. £ s. d.	£ s. d.
1 in. by 7 in. yellow, planed and shot	0 13 6	... 0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	... 0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	... 1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	... 0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	... 0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	... 0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	... 0 13 6
1 in. by 7 in. „ „	0 14 0	... 0 18 0
¾ in. by 7 in. white „	0 10 0	... 0 11 6
1 in. by 7 in. „ „	0 12 9	... 0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	7 5 0	... 7 15 0
Compound Girders, ordinary sections	9 10 0	... 10 10 0
Steel Compound Stanchions	12 5 0	... 13 5 0
Angles, Tees, and Channels, ordinary sections	9 5 0	... 10 5 0
Flitch Plates	9 5 0	... 10 5 0
Cast Iron Columns and Stanchions including ordinary patterns	8 0 0	... 9 0 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON— Common Bars	8 10 0	... 9 0 0
Staffordshire Crown Bars, good merchant quality	9 0 0	... 9 10 0
Staffordshire "Marked Bars"	11 0 0	—
Mild Steel Bars	9 5 0	... 9 10 0
Hoop Iron, basis price	9 10 0	... 9 15 0
„ „ Galvanised	17 10 0	—
("And upwards, according to size and gauge.)		
Sheet Iron Black— Ordinary sizes to 20 g.	10 0 0	—
„ „ 24 g.	11 0 0	—
„ „ 26 g.	12 10 0	—
Sheet Iron, Galvanised, flat, ordinary quality— Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14 10 0	—
Ordinary sizes to 22 g. and 24 g.	15 0 0	—
„ „ 26 g.	15 10 0	—
Sheet Iron, Galvanised, flat, best quality— Ordinary sizes to 20 g.	17 10 0	—
„ „ 22 g. and 24 g.	18 0 0	—
„ „ 26 g.	19 10 0	—
Galvanised Corrugated Sheets— Ordinary sizes 6 ft. to 8 ft. 20 g.	14 10 0	—
„ „ 22 g. and 24 g.	14 15 0	—
„ „ 26 g.	16 0 0	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	12 0 0	—
Best Soft Steel Sheets, 22 g. & 24 g.	13 0 0	—
„ „ „ 26 g.	15 0 0	—
Cut Nails, 3 in. to 6 in.	10 0 0	... 10 10 0

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3lb. and up.	22 0 0	... —
Pipe in coils	22 10 0	... —
Soil pipe	25 0 0	... —
Compo pipe	25 0 0	... —
ZINC—Sheet— Vieille Montagne ton	34 0 0	... —
Silesian	33 15 0	... —
COPPER— Strong Sheet per lb.	0 1 4	... —
Thin „	0 1 5	... —
Copper nails „	0 1 3	... —
BRASS— Strong Sheet „	0 1 2	... —
Thin „	0 1 3	... —
TIN—English Ingots „	0 1 11	... —
SOLDER—Plumbers' „	0 0 9	... —
Tinmen's „	0 0 11½	... —
Blowpipe „	0 1 1	... —

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2½d. per ft. delivered.
„ fourths	1¾d. „ „
21 oz. thirds	3d. „ „
„ fourths	2¼d. „ „
26 oz. thirds	4d. „ „
„ fourths	3¼d. „ „
32 oz. thirds	5d. „ „
„ fourths	4¼d. „ „
Fluted Sheet, 15 oz.	3½d. „ „
„ 21 oz.	4¾d. „ „

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

⅛ Hartley's	2½d. per ft. delivered.
¼ „	2¾d. „ „
⅜ „	3½d. „ „
Figured and Oxford Rolled	
"Oceanic" Glass, white	4d. „ „
Do. „ tinted	5¼d. „ „

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 10
„ „ „ in barrels	„	0 1 11
„ „ „ in drums	„	0 2 1
Boiled „ „ in pipes	„	0 2 0
„ „ „ in barrels	„	0 2 1
„ „ „ in drums	„	0 2 3
Turpentine in barrels	„	0 4 0
„ in drums	„	0 4 2
Genuine Ground English White Lead	per ton	25 0 0
Red Lead, Dry	„	24 0 0
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

PUBLISHER'S NOTICES.

Nat. Tel., 6112 Gerrard. Telegrams, "The Builder, London."

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PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps must not be sent, but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," 4, Catherine Street, W.C.

Advertisements or the current week's issue are received up to HALF-PAST ONE p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST TWELVE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE NOON on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, etc., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

ADVERTISERS in "THE BUILDER" may have Replies addressed to the Office, 4, Catherine Street, Strand, London, W.C., free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unstamped letters are reserved to advertisers the week after publication.

N.B.—The Weekly Issues are not intended for trade lists, circulars, and the like; should these be received, they cannot (if desired) be forwarded.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES { SIXPENCE EACH. By post (carefully packed) 1s. }

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABERDARE.—For heating the higher standard schools, for the Urban District Council Education Committee. Mr. T. Roderick, architect, Clifton-street, Aberdare:—

Hampton & Co., Cardiff* £270

ABERDEEN.—For macadamising roads, etc., for the Town Council. Mr. W. Dyack, Burgh Surveyor, Town House, Aberdeen:—

J. Leith, 321, Clifton-road*—

Macadamising Sunnybank-place	£42 5 8
Ditto lane from Walker-road to Menzies-road..	76 13 6
Ditto lane from Walker-road to Grampian-road	67 12 3

ALDBOROUGH.—For erecting new school for Norfolk Education Committee. Mr. C. J. Brown, architect, Cathedral Close, Norwich:—

R. Chapman..	£2,560 0 0	Youngs & Son	£2,187 0 0
G. A. Lines ..	2,525 0 0	R. Shanks....	2,150 0 0
W. Porter....	2,470 0 0	T. H. Blyth ..	2,120 1 6
C. T. Baker Ltd.	2,390 18 0	T. H. Yelf....	2,094 0 0
W. J. Hannant	2,300 0 0	H. C. Greengrass	2,076 0 0
J. McKay	2,298 0 0	J. H. Nealo ..	2,070 0 0
J. H. Mickleburgh.....	2,295 0 0	Stowers & Son	2,055 0 0
Blyth & Son ..	2,282 0 0	R. C. Watts, Buxton, Nch*	2,035 0 0

DARTFORD.—For road repairs at Gore Farm (convalescent fever) Hospital, for the Metropolitan Asylums Board. Mr. W. Harston, Surveyor, Dartford:—

J. C. Trueman	£199 0
Road Maintenance & Stone Supply Co., Ltd.	114 19
F. Miskin, Ltd., Milton Wharf, Gravesend*	100 0

ENFIELD.—For street works, for the Urban District Council. Mr. R. Collins, Surveyor, Public Offices, Enfield:—

G. Napier & Sons, Ltd.	£2,559 10 8
J. Jackson	2,429 15 7
Imperial Stone Co.	2,409 15 0
G. Bell & Sons, Ltd.	2,397 7 9
W. Griffiths (Alternative)	2,338 7 10
Grounds & Newton.....	2,335 8 6
W. H. Mayhew	2,330 10 3
T. Adams	2,288 13 0
Wallace & Inns	2,281 15 6
Fry Bros.	2,270 1 9
W. Griffiths	2,268 3 1
Atlas Stone Co., Ltd.	2,225 6 3
Jennings & Grenfell	2,220 0 0
A. Monk	2,211 15 3
E. Knifton	2,194 7 9
T. Free & Sons.....	2,169 7 5
Bower Bros	2,154 15 6
J. Ellis & Sons, Ltd.	2,127 7 11
Empire Stone Co.	2 112 15 10
A. Walker & Son, Ltd.	2,036 0 0
E. J. Betts	1,927 2 0

ENFIELD.—For the erection of an infirmary for fifty beds at the Chase Farm Schools, Enfield, for the Guardians of the Edmonton Union. Mr. Stuart Hill, architect, 106, Cannon-street, E.C. Quantities by Mr. Joseph Peebles, 7, Southampton-street, Bloomsbury, W.C.:—

S. J. Collins	£8,500 0	J. Greenwood & Co., Ltd., ...	£6,571 0
A. Roberts & Co.	7,200 0	Rowley Bros. ..	6,558 0
Hyde & Co.	7,080 0	A. Fairhead & Son	6,497 0
R. Jackson & Co.	6,997 0	A. Monk	6,492 0
A. Faulks	6,986 0	B. E. Nightingale	6,474 0
Patman & Fotheringham	6,965 0	C. Wall Ltd.....	6,440 0
J. Thomas	6,929 0	Mattock Bros. ..	6,375 0
F. Webster & Son	6,850 0	W. Lawrence & Son	6,294 0
L. & W. H. Patman	6,780 0	Fitch & Cox....	6,264 0
H. Knight & Son	6,749 0	F. & G. Foster..	6,155 0
Loasby & Salmon	6,600 17		

GERRARD'S CROSS.—For a house and stables at Gerrard's Cross, for Mr. W. G. Blakemore. Mr. Hugo R. Bird, architect and surveyor, Brentwood, Essex:—

G. Darlington	£1,730	H. Brown	£1,423
F. W. Burtwell	1,663	E. Dix	1,392
Watkins	1,640	F. Jarvis, Brentwood‡	1,365
Y. J. Lovell & Son	1,468		

‡ Recommended for acceptance.

HINGHAM.—For reconstruction of sanitary offices and other improvements at Hingham School, for the Norfolk Education Committee:—

Cubitt & Gotto	£433 16 0	Ebbs & Barton	£363 16 6
J. Youngs & Son	417 0 0	A. J. Harrison..	349 0 0
C. Monument ..	400 10 0	H. C. Tofts	346 8 7
J. H. Mickleburgh	375 0 0	C. Durrant	346 2 0
W. Woodward..	370 0 0	Springall & Son	341 0 0
E. J. Smith	370 0 0	R. Shanks, Hingham* ..	320 0 0
H. P. Bowden..	364 0 0		

HUDDERSFIELD.—For additions to cleaning works at Seed-hill, for Messrs. J. Holroyd & Co., Ltd. Messrs. Stocks & Sykes, architects, St. Peter's-street, Huddersfield. Quantities by the architects:—

Masons: Law Stead & Sons*	£577 10 0
Joiner: J. C. Tarbutt*	361 0 0
Plumber: J. Marsden*	169 10 0
Ironfounders: H. Brook & Co*	160 4 0
Slater: W. E. Jowitt*	63 0 0
Painters: Beevers & Son*	33 0 0
Plasterer: W. E. Jowitt*	20 0 0

[*All of Huddersfield.]

KING'S NORTON.—For sewering Monyhull Hall Estate, for King's Norton and Northfield Urban District Council. Mr. A. W. Cross, Surveyor, 23 and 25, Valentine-road, King's Heath:—

Sutherland & Thorpe....	£6,663 0 2	G. Trentham.	£4,000 0 0
W. F. Hobrough	5,293 0 0	J. Riley	3,918 13 4
G. Holloway .	5,250 0 0	T. H. McDonald	3,893 0 0
Currall, Lewis, & Martin, Ltd.....	4,869 0 0	W. Cunliffe ..	3,890 0 0
Lock & Price	4,408 0 0	F. Osenton ..	3,408 0 0
		R. H. B. Neal, Ltd., Plymouth* ..	3,317 9 10

LEICESTER.—For reinstating spinning mill after fire, for Messrs. Donisthorpe & Co., Ltd. Messrs. Talt & Herbert, architects, Leicester and Coventry:—

J. E. Johnson & Son, Leicester* (lowest).. £795

LONDON.—For supply of fittings, etc., for convenience in Lower Richmond-road (Hammersmith to Putney tramways), for the London County Council:—

Doulton & Co., Ltd.	£403 0 0
B. Finch & Co., Ltd.....	397 0 0
G. & D. Musgrave, Ltd.	386 16 6
G. Jennings, Ltd.	302 15 10
Adamsez, Ltd., Westminster*.....	297 19 3

LONDON.—For erecting headquarters, riding school, stables, shops, and club premises for the 2nd County of London (Westminster Dragoons) Imperial Yeomanry at the corner of Horseferry-road and Elverton-street, S.W. Mr. D. B. Hedderwick, architect, 38, Great James'-street, Bedford-row, W.C. Quantities by Mr. A. R. Henderson, 46A, Pall-mall, S.W.:—

Colls & Sons & Trollope & Sons....	£14,300 0 0
Hibberd Bros., Ltd.....	13,657 8 3
W. S. Shepherd & Co.....	12,988 0 0
Higgs & Hills, Ltd.	12,838 0 0
W. H. Lorden & Son	12,674 0 0
Sabey & Sons	12,616 0 0
Patman & Fotheringham, Ltd.	12,583 0 0
W. Wallis	12,436 0 0
Sheffield Bros.	12,288 0 0
F. & H. F. Higgs	12,247 0 0
G. Longden & Son, Ltd.*	12,098 0 0

LONDON.—Improvements, British-street, Poplar, for the London County Council:—

[The revised accommodation, on the completion of the improvements, will be for 322 boys, 322 girls, and 356 infants, total, 1,000, being a gain of 4 places in the boys' department, 55 places in the girls' department, and a loss of 43 places in the infants' department. There will, therefore, be a net gain of 16 places in the total accommodation of the school.]

J. Appleby & Sons	£12,660 0 0
W. Lawrence & Son.....	12,387 0 0
W. Gregar & Son	11,997 0 0
J. & M. Patrick	11,735 0 0
E. Lawrance & Sons	11,697 0 0
Kirk & Randall	11,690 0 0
W. H. Lascelles & Co., Ltd.	11,597 0 0
J. Parsons.....	11,442 9 5
T. D. Leng	11,419 0 0
G. E. Wallis & Sons, Ltd.	11,203 0 0
Treasure & Son, Cottenham-road, Upper Holloway*.....	10,559 0 0

[The estimate of the Architect (Education), comparable with the tenders, is £10,620.]

LONDON.—For new penstock, southern high level sewer No. 2—Section E, for the London County Council:—

Glenfield & Kennedy, Ltd...	£319 10	J. Blakeborough & Sons	£230 0
J. Cochrane.....	315 0	G. Waller & Son, Stroud*	214 0
Hunter & English	283 0		
Ashton, Frost & Co., Ltd.	270 0		

LONDON.—For new street works, for Camberwell Borough Council. Mr. W. Oxtoby, A.M.I.C.E., Engineer and Surveyor, Town Hall, Peckham-road, S.E.:—

C. W. Killingback & Co.	£1,377 7 8
E. Rogers & Co.	1,296 0 0
J. Edge & Co.	1,159 12 1
H. Prentis.....	1,111 19 2
T. Adams	1,067 9 10
J. Jackson	1,002 16 3
E. & E. Iles	977 3 7
H. Woodham & Sons	954 4 6
Fry Bros.	901 15 8
G. J. Anderson	900 8 10
W. Pearce.....	865 18 11
J. Mowlem & Co.....	865 0 0
J. E. Etheridge	861 8 10
A. C. W. Hobman & Co.	824 10 1
W. H. Wheeler, 235 Blackfriars-rd.*	808 11 9

LONDON.—For the erection of a mortuary, coroner's court, etc., Baildon-street and Watson-street, Deptford, for Deptford Borough Council. Mr. H. T. Bonner, A.R.I.B.A.:—

R. L. Stuart & Sons	£5,640 15 1	F. & G. Foster	£4,663 0 0
Thompson Bros.	5,483 0 0	H. Kent.....	4,639 0 0
J. Fenn Scott	5,137 5 7	T. G. Sharpington	4,635 0 0
A. J. Ware ..	5,127 0 0	Loasby & Salmon	4,634 19 0
F. J. Gorham	5,080 10 2	B. E. Nightingale	4,610 0 0
W. F. Blay ..	4,997 3 0	H. L. Holloway	4,594 0 0
McLaughlin & Harvey	4,979 0 0	W. Roberts ..	4,556 4 7
A. Roberts & Co., Ltd. ..	4,880 0 0	Martin, Wells, & Co., Ltd...	4,548 0 0
C. P. Roberts	4,863 0 0	H. Groves....	4,535 0 0
Mattock & Parsons	4,838 0 0	Courtney & Fairbairn ..	4,357 7 0
J. & C. Bowyer	4,824 0 0	Hyde & Co. ..	4,349 0 0
W. Mills	4,796 0 0	W. Dennison..	4,265 0 0
T. D. Leng ..	4,756 1 0	S. B. Baldwin, 10, Kemble-rd., Croydon*	4,144 9 8
H. H. Hollingsworth.....	4,687 0 0		

LONDON.—For finishing of carriage-ways and footways on Sections A and B, Totterdown-fields Estate, for the London County Council:—

S. Kavanagh & Co.....	£6,926 0 9
C. W. Killingback & Co.	6,643 6 7
J. Mowlem & Co., Ltd.	6,290 0 0
W. Griffiths & Co., Ltd.....	6,120 11 7
E. & E. Iles	5,910 7 0
G. Wimpey & Co.	5,841 11 2
O. T. Gibbons	5,474 19 1
W. Manders.....	5,401 4 4
F. J. Coxhead, Leytonstone*	5,391 0 0
Grounds & Newton.....	5,084 7 4

[The estimate of the architect comparable with the tenders is £5,990.]

LONDON.—For the construction of underground convenience in Theobald's-road and additions to Shaftesbury-avenue convenience, for Holborn Borough Council. Quantities by Messrs. Gardner & Theobald, 110, Great Russell-street:—

—	Theobald's-road.	Shaftesbury-avenue.	Total.
	£ s. d.	£ s. d.	£ s. d.
E. J. Clayton	4,360 0 0	897 0 0	5,257 0 0
F. & E. Davey, Ltd.	4,850 0 0	1,137 0 0	5,987 0 0
Davis, Bennett, & Co.	3,849 0 0	849 0 0	4,798 0 0
C. Dearing & Sons	4,060 0 0	914 0 0	4,974 0 0
Doulton & Co., Ltd.	4,340 0 0	1,023 0 0	5,363 0 0
F. & G. Foster.....	3,396 0 0	914 0 0	4,710 0 0
G. Jennings, Ltd.	4,063 3 4	648 10 0*	4,711 13 4
W. Johnson & Co.	3,507 0 0*	876 0 0	4,383 0 0
C. W. Killingback & Co.	4,330 0 0	1,070 0 0	5,400 0 0
Martin, Wells, & Co., Ltd.....	3,999 0 0	989 0 0	4,988 0 0
Mellowes & Co., Ltd.	3,878 0 0	777 0 0	4,655 0 0
B. E. Nightingale	3,590 0 0	796 0 0	4,386 0 0
J. Parsons	3,826 0 0	801 0 0	4,627 0 0
D. R. Paterson	3,647 6 8	787 3 3	4,434 9 11
Patman & Fotheringham	3,683 0 0	810 0 0	4,493 0 0
C. B. Price	3,950 0 0	900 0 0	4,850 0 0
Spencer, Santo, & Co., Ltd.	3,870 0 0	976 0 0	4,846 0 0

[Borough Surveyor's estimates, Theobald's-road, £3,866. Shaftesbury-avenue, £887.]

LONDON.—For the supply of lime for the treatment of sewage, for the Main Drainage Committee of the County Council:—

Name of Tenderer.	Delivered at Barking (14,800 tons).		Delivered at Crossness (9,000 tons).		Delivered at Barking and Crossness.	
	Alongside Jetty.	Into Store.	Alongside Jetty.	Into Store.	Alongside Jetty.	Into Store.
	Per Ton. s. d.	Per Ton. s. d.	Per Ton. s. d.	Per Ton. s. d.	Per Ton. s. d.	Per Ton. s. d.
Formby's Cement Works Co., Ltd., Grosvenor-road, S.W.*	*11 11	*13 3	12 4	13 9	12 2	13 6
Fletcher & Co., Gravesend, Kent*	—	—	*12 3	*13 8	—	—
Associated Portland Cement Manufacturers (1900), Ltd.	14 1	15 7	13 7	15 1	14 1	15 7
Peters Bros.	14 2	15 6	14 2	15 6	14 2	15 6
L. Sommerfeld	14 9	16 3	14 9	16 3	14 9	16 3
Hall & Co. (Croydon), Ltd.	—	—	15 0	16 4	—	—
C. Christopherson & Co.	—	—	15 9	—	—	—
Trechmann, Weeks, & Co., Ltd.	16 6	— (For 5,000 tons only).	16 6	—	16 6	—
Current contract prices	—	—	—	13 8	—	13 5

LONDON.—For laying-out works, Ruskin-park, for the London County Council:—

D. Rowell & Co.	£359 10 0
The Hope Foundry Co.	340 15 0
L. Faulkner & Son	323 0 0
Bayliss, Jones & Bayliss, Ltd.,	316 0 0
W. Gratrix & Sons	298 11 9
E. J. Rayhould & Co., Ltd.	288 1 3
J. Elwell	279 0 0
M. McVey	275 9 9
Hill & Smith, Brierley-hill Iron Works Staffordshire*	270 13 7

LOWER WHITWOOD.—For erecting two dwelling-houses and shop and stables, Castleford-road. Mr. A. Hartley, architect and surveyor, County-chambers, Castleford:—
T. G. Wright & Sons, Oxford-street, Castleford*.. £660

MARDY.—For erecting new buildings at Mardy, Glamorganshire, for the Ferndale Industrial Co-operative Society, Ltd. Messrs. Lewis & Morgan, architects, Pontypridd:—

D. Richards ..	£2 971	9 3	Williams Bros. £2,001 7 7
G. Harries....	2 855	0 0	D. Davies 1,960 0 0
J. Jenkins....	2,101	0 0	J. B. Mundy. Llandaff North, near Cardiff*.... 1,870 14 0
W. Williams..	2,099	0 0	
Smith, Jones, & Son.....	2,639	15 7	

MATLOCK.—For taking down existing buildings and walls and the rebuilding of walls in Bakewell-road, for the Urban District Council Mr. J. Diggle, Engineer and Surveyor, Town Hall, Matlock:—
Antliff Bros., Matlock £222

MILL HILL.—For new sorting office for H.M. Commissioners of Works:—

E. Lawrance & Sons.....	£2,009	0	Galbraith Bros... £1,735 0
S. Lisner	1,916	0	E. Brown & Son 1,732 5
W. Tout.....	1,815	0	C. Ansell..... 1,717 0
Martin, Wells, & Co., Ltd.....	1,799	0	J. Barker & Co... 1,693 0
Patman & Fotheringham, Ltd. ..	1,793	0	A. Fairhead & Son 1,687 0
Speechley & Smith	1,775	0	F. Gough & Co... 1,684 0
F. & A. Willmott	1,761	0	Perry Bros. 1,667 0
E. Wallis.....	1,756	0	R. E. Nightingale 1,594 0
Banyard & Son..	1,750	0	F. & G. Foster .. 1,590 0
			G. Wiggs..... 1,588 0
			Hyde & Co..... 1,567 0

MONMOUTH.—Accepted for the erection of house and stables on the Red House Estate, for Capt. H. Pedersen. Mr. E. G. Davies, architect, Hereford and Monmouth:—
J. Hall, Monmouth £695

NORWICH.—For steam mains and fittings at the Workhouse, for the Guardians. Messrs. Morgan & Buckingham, architects and surveyors, 3, Redwell-street, Norwich:—
Brightside Foundry and Engineering Co., Ltd., Sheffield* £555

PENGAM.—For erecting a chapel schoolroom, for the Calvinistic Methodists. Rhymney District. Mr. Wm. Harris, architect and surveyor, Gilfach, Bargoed:—

Morgan & Watkins	£580	2	T. I. Evans £521 10
R. Jones	537	0	Y. P. Williams, Aber* 498 10
D. Williams.....	529	0	
H. Y. Davis.....	523	0	

PONTRHYTHALLT.—For erecting a new chapel adjoining Pontrhythallt Station, for the Llanrug C.M. Chapel Committee. Mr. E. F. White, architect and surveyor, 27, Bangor-street, Carnarvon:—
E. Jones & Son, Plasdolyd, Llanwnda, nr. Carnarvon £1,440

PONTYPRIDD.—For private street works in Madoc-street, for the Urban District Council. Mr. P. R. A. Willoughby, Engineer and Surveyor, Pontypridd:—
G. L. Morgan, Pontypridd* £225 3

PONTYPRIDD.—For private street works in Factory-lane, for the Urban District Council. Mr. P. R. A. Willoughby, Engineer and Surveyor, Pontypridd:—
J. E. Evans, Pontypridd* £61 2 1

PONTYPRIDD.—For private street works in Graig-terrace, for the Urban District Council. Mr. P. R. A. Willoughby, Engineer and Surveyor, Pontypridd:—
G. L. Morgan, Pontypridd* £648 12 3½

PONTYPRIDD.—For 376 yds. of stoneware pipe sewers and contingent works, for the Urban District Council. Mr. P. R. A. Willoughby, Engineer and Surveyor, Pontypridd:—
J. E. Evans, Pontypridd* £124 7 9

PONTYPRIDD.—For private street works in Wood-street, Cilfynydd, for the Urban District Council. Mr. P. R. A. Willoughby, Engineer and Surveyor, Pontypridd:—
G. L. Morgan, Pontypridd* £910 17 2

SWANAGE.—For making-up roads on the Court Park Estate for the Urban District Council. Mr. I. Sidney, senior, Town Hall, Swanage:—

G. T. Budden..	£677	6 9	Burt & Burt.. £621 0 0
Grounds & Newton....	664	0 0	G. Pond, Swanage*..... 588 2 1

TAUNTON.—For the construction and making up of Gyffarde-street and Stephen-street Priory, for the Town Council. Mr. D. Edwards, A.M.Inst.C.E., Borough Engineer and Surveyor, Municipal-buildings, Taunton:—

Gyffarde-street.

W. C. Shaddock Surveyor's Estimate....	£199	4 0	Geo. Pollard & Co..... £176 2 10
F. Small.....	193	17 2	J. Y. Coles, Taunton* .. 166 15 2
	193	15 1	

Stephen-street.

W. C. Shaddock Surveyor's Estimate	£287	14 0	Geo. Pollard & Co. £249 12 9
F. Small	287	15 5	J. Y. Coles, Taunton* .. 236 0 9
	281	14 7	

TWICKENHAM.—For private street improvement works (Bridge-road, Broadway-avenue, Carnac-road, etc.), for the Urban District Council. Mr. F. W. Pearce, Surveyor, Town Hall, Twickenham:—

F. Hoffman, Egham*	£290 14 7	Bridge-road
	463 9 4	Carnac-road
	246 4 6	Radnor-road
	1,134 7 11	Lebanon Park
	719 6 3	Laurel-avenue
Shepherd & Sons, Teddington*	479 15 0	Broadway-avenue

UTTOXETER.—For sewerage extension (Contract No. 2), for the Urban District Council. Messrs. Willcox & Raikes, Engineers, 63, Temple-row, Birmingham:—
W. H. Reading, Fawcett-street, Wolverhampton* £1,200

WENDLING.—For enlargement and improvement of Wendling school, for the Norfolk Education Committee:—

W. Larner	£623	0 0	H. C. Tofts.... £505 1 11
W. Crane	602	6 6	Tash & Langley 497 13 10
J. Youngs & Son	577	0 0	E. Mack 495 4 2
I. W. Fisher ..	571	4 5	R. Shanks 495 0 0
Cubitt & Gotto	570	5 6	Burton & Sons 483 11 6
J. Mickleburgh	563	0 0	J. Needs, Fakenham* 474 0 0
E. J. Smith....	525	0 0	
Springall & Son	512	0 0	Brummitt & Co. 472 14 0
Ebbs & Barton	510	15 10	C. Durrant.... 495 4 8

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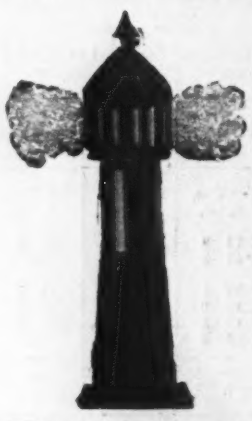

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